



विज्ञान एवं प्रौद्योगिकी विभाग
DEPARTMENT OF
SCIENCE & TECHNOLOGY



pragati₂₀₂₆

Q-FOUNDRY

INDIA'S
QUANTUM TECHNOLOGY LANDSCAPE

INNOVATE • CONNECT • TRANSFORM

RESEARCH | STARTUPS | INDUSTRY | TECHNOLOGY TRANSLATION

SEPTEMBER 2026



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SEPTEMBER 2026



India must now move decisively from quantum research to quantum leadership. The National Quantum Mission has created the foundation; PRAGATI Q-FOUNDRY must accelerate its translation into indigenous technologies, globally competitive products and impactful applications. Our ambition is clear—to build, scale and deploy quantum technologies in India, and position our nation at the forefront of the global quantum revolution.

DR. JITENDRA SINGH

*HON'BLE UNION MINISTER OF STATE (IC)
MINISTRY OF SCIENCE & TECHNOLOGY
AND EARTH SCIENCES*





Quantum technologies represent a transformative frontier of science and innovation, with the potential to reshape industries, strengthen national capabilities and address complex societal challenges. Through the National Quantum Mission, India is building a robust ecosystem that brings together scientific institutions, startups, industry and strategic stakeholders. PRAGATI Q-FOUNDRY is a significant step in translating our scientific strengths into indigenous technologies, globally competitive enterprises and solutions that serve the nation.

PROF. ABHAY KARANDIKAR

*MEMBER (SCIENCE & TECHNOLOGY)
NITI AAYOG*





The journey from scientific discovery to societal impact requires sustained collaboration, technological maturity and a shared national vision. The National Quantum Mission provides an important platform to advance frontier research while accelerating the development and deployment of quantum technologies. PRAGATI Q-FOUNDRY embodies this vision by connecting research with enterprise, fostering innovation and enabling India to emerge as a significant contributor to the global quantum technology landscape.

PROF. AJAY KUMAR SOOD

*PRINCIPAL SCIENTIFIC ADVISER
TO THE GOVERNMENT OF INDIA*





Since 2023, the National Quantum Mission of the Department of Science and Technology is engaged in advanced infrastructure and human capacity building within the ecosystem to nurture entrepreneurship and partnerships, strategically to develop indigenous quantum computing, communication and sensing technologies. Expecting their impact in health, energy, finance, space and defense sectors, PRAGATI Q-FOUNDRY 2026, a landmark event of the mission brings together researchers, entrepreneurs, investors, industry and the relevant stakeholders to benefit from and contribute to this endeavor of national and global importance.

PROF. UMESH V. WAGHMARE

*SECRETARY
DEPARTMENT OF SCIENCE & TECHNOLOGY
GOVERNMENT OF INDIA*





India's quantum journey must move decisively from laboratories to markets, from promising research to scalable products, and from technological capability to global competitiveness. PRAGATI Q-FOUNDRY provides a vital platform for connecting innovators with industry, investors and strategic users, while creating opportunities for collaboration, investment and enterprise building. By nurturing Indian startups, strengthening domestic manufacturing and fostering industry-led innovation, we can build a vibrant quantum ecosystem that creates value for India and contributes to the world.

DR. AJAI CHOWDHRY

*CHAIRMAN
MISSION GOVERNING BOARD
NATIONAL QUANTUM MISSION*





FOREWORD

India is embarking on a transformative journey in quantum technologies through the National Quantum Mission (NQM), the Department of Science and Technology (DST), with a vision to build indigenous capabilities, foster innovation and translate scientific excellence into technologies of national and global relevance.

PRAGATI Q-FOUNDRY 2026 marks an important milestone in this journey, bringing together researchers, startups, industry, investors, strategic users and State Governments on a common platform. It embodies our collective commitment to bridging the gap between laboratory research and market-ready technologies, while fostering collaboration, investment and entrepreneurship under NQM.

Through its four Thematic Hubs, the Mission is building a vibrant ecosystem across quantum computing, communication, sensing & metrology, and materials & devices. As we progress, our focus is on technology maturation, indigenous manufacturing, startup growth and adoption across strategic and industrial sectors.

This Coffee Table Book captures the achievements, aspirations and collaborative spirit of India's emerging quantum ecosystem. I extend my sincere appreciation to all institutions, researchers, entrepreneurs and partners contributing to this national endeavour.

I am confident that PRAGATI Q-FOUNDRY 2026 will catalyse new partnerships and accelerate India's journey towards a globally competitive quantum technology ecosystem.

Together, let us transform quantum innovation into technological capability and national progress.



Dr. J.B.V. Reddy

Head, Quantum Technology Cell (QTC)
National Quantum Mission (NQM)
Department of Science & Technology
Government of India





QUANTUM MATERIALS & DEVICES

*BUILDING THE FOUNDATIONAL MATERIALS AND DEVICES
FOR INDIA'S QUANTUM FUTURE*



QUANTUM TECHNOLOGY LANDSCAPE





NARD PHOTONICS

Quantum-Grade Photonics Engineered for Trust



CONNECT WITH US

PRODUCT LINE



NARD-1550
Sub-1 kHz linewidth · RIN < -155 dBc/Hz · 1550.12 nm · 19" 1U



NARD-SPAD1550
DE > 25% · DCR < 500 cps · jitter < 100 ps · TEC -50 °C · 19" 1U

ONE SHARED ELECTRONICS PLATFORM

TEC drivers · low-noise bias · control firmware · 1U mechanics — one BOM, one service stack.

Engineering renderings — not photographs

INNOVATION OVERVIEW

PROBLEM: India has no domestic supplier of the two foundational 1550 nm quantum components - narrow-linewidth CW lasers and InGaAs/InP single-photon detectors. Labs import at USD 18,000–22,000 per unit on 12–20 week lead times, under Wassenaar and EAR dual-use export control.

SOLUTION: Two indigenous 1U rack products at benchmark specification: NARD-1550, a DFB plus high-Q FBG external-cavity fibre laser at sub-1 kHz linewidth; and NARD-SPAD1550, a TEC-cooled InGaAs/InP single-photon detector at over 25% efficiency. One shared electronics platform, 30–40% below import price.

KEY BREAKTHROUGHS

An all-fibre DFB plus high-Q FBG external cavity extends the resonator over 100x, pulling linewidth below 1 kHz with no free-space alignment to hold, while a proprietary RIN-suppression servo holds intensity noise under -155 dBc/Hz. A 3-stage TEC reaches -20 °C without cryogenics for under 500 cps dark count, and an active quench-and-reset stage spans 1 ns gated to CW free-running at under 1 μs dead time. Both products share similar electronics platform. Target pricing places both at a fraction of the imported equivalent while matching international benchmark specifications.

SECTOR IMPACT

4–8×

COST REDUCTION

Benchmark specification at 30–40% below imported laser and detector prices.

ZERO

IMPORT DEPENDENCE

Removes Wassenaar and EAR licence exposure from DRDO, ISRO, BARC and NQM procurement.

USD 14 M

OBTAINABLE MARKET

Indian strategic and research demand across both product lines over five years.

400+

ADDRESSABLE UNITS

QT hubs, DRDO, ISRO, BARC, C-DOT and NQM-funded QKD ventures, Year 1–5.

MILESTONES & STATUS

TODAY

Laser drivers prototyped; InGaAs APD characterisation complete; quench circuit in development

MONTHS 1–4

DFB + high-Q FBG cavity; SPAD die from 3 suppliers; linewidth < 5 kHz, DCR < 2,000 cps

MONTHS 3–8

RIN-suppression and active quench-reset PCBs; after-pulsing < 2%, RIN < -150 dBc/Hz

MONTHS 6–10

3-stage TEC to -20 °C; TDC integration; DCR < 500 cps, jitter < 150 ps

MONTHS 9–13

Integrated 1U rack MVPs; all specifications within 1.5× of final target

MONTHS 12–18

Validation at IIT Delhi and BARC, QBER < 3%; first 5–10 pilot units; BIS submission



Minakshi
Co-founder,
CEO



Saloni
Co-founder,
CTO



Dr Ravi
Photonics
lead



Prashast
Electronics
lead



CONNECT WITH US



Raana Semiconductors Pvt. Ltd.

India's first & only Crystal Growth Technology Company

INNOVATION OVERVIEW

PROBLEM: Crystals such as Lithium Niobate are foundational to quantum technologies. Yet, India relies entirely on imports for these critical materials, creating a key vulnerability in the National Quantum Mission's supply chain.

SOLUTION: Raana Semiconductors is India's first and only Czochralski crystal growth technology company, with in-house expertise in Lithium Niobate. We enable domestic supply of quantum-grade LiNbO_3 substrates, strengthening the upstream materials base essential to the National Quantum Mission.

KEY BREAKTHROUGHS

Raana Semiconductors has successfully grown a Lithium Niobate (LiNbO_3) single crystal at its Hosur facility using the Czochralski method, making RSPL the only company in India currently growing this crystal. This positions RSPL as the first private company to demonstrate indigenous LiNbO_3 growth capability. Building on this, RSPL intends to scale toward periodically poled Lithium Niobate (PPLN), the primary substrate used in quantum photonic devices, entangled photon sources, and quantum communication systems.

SECTOR IMPACT

9.8% CAGR

GROWTH 9.8% CAGR
Lithium niobate crystals market growing at 9.8% CAGR

ZERO

IMPORT DEPENDENCE
Crystal growth tech and optical materials fall under dual-use export controls, subjecting to export restrictions.

USD 600 M

OBTAINABLE MARKET
Global Obtainable market is \$600M over next 10 years.

SECURE SUPPLY CHAIN

Foreign - dominated supply
Reduces India's exposure to a supply chain concentrated in a geopolitically sensitive market

MILESTONES & STATUS

Month 0
Growth Capability Demonstrated
 LiNbO_3 single crystal grown in-house by the CZ method on indigenously built equipment

MONTHS 6
Single-Crystal Boule
1-inch LiNbO_3 boule, Z-axis (001), grown crack-free and reproducibly across consecutive runs.

MONTHS 12
Quantum-Grade Wafer
Z-cut wafer 10x10x2 mm. Lapped and polished to optical-grade finish.

MONTHS 18
Quantum-Grade Wafer
Refined wafer of quantum-grade purity, homogeneity and surface specs for quantum-optical applications

MONTHS 24
Documentation
Final report, process datasets, characterisation and knowledge transfer to QMD / IIT-D.



Rajasekar Elavarasan
Founder & CEO



Vinoth Kumar
VP Operations



Avinash Kumar
VP Technology



QUTE ELECTRONICS

Precision Electronics for Quantum Technology



CONNECT WITH US



INNOVATION OVERVIEW

PROBLEM: Precision power supply used in quantum applications are manufactured by select few entities across the world leading to high costs, long lead time and low serviceability.

SOLUTION: Qute indigenously manufactures ppm-stable quantum-grade electronics in India, ultra-stable, low-noise, 4-6 weeks delivery, 20-30% cheaper, fully customized for every quantum platform & no export controls.

KEY BREAKTHROUGHS

- PPM-Level precision in DC voltage & current sources
- Up to 30% potential reduction in cost (indigenous manufacturing & supply chain)
- 6 Product Platforms: Voltage | Current | HEMT Bias | RF Drive | High Voltage | General Purpose
- GHz / Cryogenic: High-performance amplification and electronics for quantum measurement
- UV-Level Resolution targeted for precision qubit bias/control applications

SECTOR IMPACT



QUANTUM
COMPUTING

QUBIT BIASING & CONTROL:

- Superconducting qubits biasing
- Ion Trap Qubits biasing
- Spin Qubits biasing
- HEMT Biasing



ACADEMIC
RESEARCH

INDIGENISATION:

- Support to IISER, IIT, IISc, IUAC and other national labs
- Customized solution for experimental setup



DEFENSE &
SENSING

SOVEREIGNTY:

- InP/GaAs HEMT amplifier for Qubit Readout
- GaN HEMT for Pulse Radar
- Cryogenic electronics for Quantum



INDUSTRY &
ENTERPRISE

COMMERCIALIZATION:

- Quantum hardware manufactures
- Support National Quantum Mission
- Scalable, cost-competitive, Indigenous solutions

MILESTONES & STATUS

NOV, 2025

Incorporated as IUAC New Delhi spin-off.

JAN, 2026

Recognized by iHub-AWaDH, IIT Ropar

FEB, 2026

Signed MoU with Amaravati Quantum Valley

APR, 2026

Funded by iHub QMD Foundation + recognized as one of 17 NQM supported Startup

JUL, 2026

First Indigenous HEMT Biasing controller developed for Domestic Quantum Hardware

CURRENT STATUS

Precision electronics lab facility setup outside IUAC and now operational



Dr. Sugam
Kumar
Non-executive
Director



Dr. Anoop
Kumar
CEO



Dr. C. P.
Safvan
CTO



Dr. L. V.
Subramaniam
COO



CONNECT WITH US



YANTRAM INSTRUMENTS PVT LTD

where alignment is everything

INNOVATION OVERVIEW

PROBLEM: Quantum materials and devices research needs indigenously produced equipment in India. Over 90% is imported crores per system, 6–24 month lead times, negligible local service.

SOLUTION: Indigenous all optical and magneto-optical spectrosopes, 2D transfer systems, electromagnets and precision optomechanics 40–70% cheaper, delivered in weeks, supported in India.

KEY BREAKTHROUGHS

- **2D DRY TRANSFER SYSTEM** – TRL 9, market-ready. 3–5x cheaper than commercial setups; live photoluminescence imaging and spectroscopy.
- **COMPACT MICRO-SPECTROSCOPY SETUP** – μ PL, μ Raman, μ Ref, μ Tr, μ Abs altogether, across 370–980 nm; 0.6 μ m spatial resolution; 5–325 K. Portable.
- **MAGNETO-OPTICAL MICRO-SPECTROSCOPY** – adds μ Faraday rotation and μ MOKE up to 2 T.
- **1.5 T AIR-COOLED ELECTROMAGNET** – optimised design, MVP ready.
- **BROADBAND LED SOURCE AND ELLIPSOMETER** – knob-tunable spectroscopy source; broadband ellipsometer prototype.

SECTOR IMPACT

40–70%

COST REDUCTION:
versus imported
equivalents



WEEKS

LEAD TIME:
against 6–24
month import cycles



>90%

IMPORT DEPENDENCE:
of high-end optical
characterisation tools
today



₹1,100 Cr

MARKET BY 2034:
India's characterisation-
tools segment

MILESTONES & STATUS

SEP, 2025
INCORPORATED
IISER Pune

MAR, 2026
MVPs READY
Broadband LED
source; 1.5 T
magnet

APR, 2026
TRL 6
6 spectroscopy
prototypes
validated

JUN, 2026
TRL 9
2D dry transfer
system, shipping

JUN, 2026
PATENTS
1 Filed,
6 inventions
drafted for filing

CURRENT STATUS
Two orders
accepted, pilot
sales under way



Prof. Ashish Arora
Founder/Director



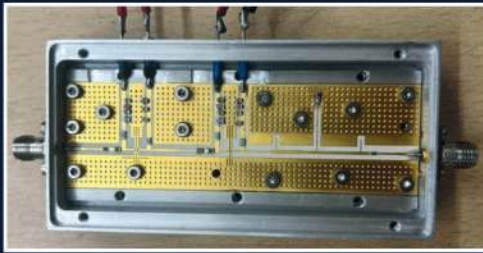
Abhisek Saidarsan
Founder/Director



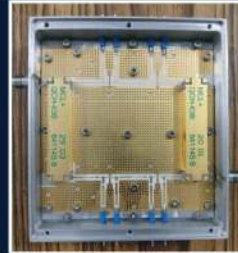
InP Cryogenic LNA for Quantum Readout

श्रमं विना न किमपि साध्यम्

FABRICATED PROTOTYPES | 1-5 GHz | TRL 3-4



Design v.1 - cascaded two-stage LNA
8.2 x 2.5 cm, aluminium packaged



Design v.2 - balanced LNA
hybrid couplers, 8 x 7.5 cm

> 25 dB

GAIN (1-5 GHz)

< 1 dB

NOISE FIGURE @ 296 K

> 15 dB

INPUT RETURN LOSS (v.2)

4-8 K

NOISE TEMP. @ 15 K

COTS InP HEMT | RT-duroid 6002 | wire-bonded, aluminium package
Cryogenic read-out amplifier developed at IIT Roorkee under the National Quantum Mission

INNOVATION OVERVIEW

PROBLEM: Qubit read-out signals are only a few photons strong. Cryogenic LNAs that amplify them without adding noise are entirely imported expensive, slow to procure and a strategic bottleneck for India's quantum stack.

SOLUTION: An indigenous two-stage InP HEMT LNA on RT-duroid 6002 with aluminium packaging – delivering >25 dB gain and <1 dB noise figure over 1–5 GHz, targeting 4–8 K noise temperature at 15 K, with a roadmap to 18 GHz.

KEY BREAKTHROUGHS

- Design v.1 (cascaded two-stage): NF 0.85–0.99 dB, gain >25.4 dB at 296 K over 1–5 GHz.
- Design v.2 (balanced, hybrid couplers): input RL >15 dB, output RL >16 dB – 3× better matching – with NF 0.86–1.18 dB and gain >24.7 dB.
- COTS InP HEMTs characterised from measured S-parameters; parasitics extracted for broadband matching.
- PCBs fabricated on RT-duroid 6002, wire-bonded, with aluminium packaging for thermal and EMI integrity.

SECTOR IMPACT

QUANTUM COMMUNICATION

Front-end for superconducting and spin-qubit read-out.

AEROSPACE

Cryogenic receiver front-ends for radio telescopes.

DEFENCE

High-sensitivity radar and satellite links.

INDUSRTY

Import Substitution:
₹1.5-2.5 L per unit,
20–30% lower at scale.

MILESTONES & STATUS

AUG, 2025
Design Approach
Topology study,
COTS device
selection, NF
specification.

NOV, 2025
Device
characterization :
COTS InP HEMT
characterised,
parasitics
extracted

FEB, 2026
DESIGN v.1
Two-stage LNA:
NF <1 dB, gain
>25 dB, 1–5 GHz.

MAY, 2026
DESIGN v.2
Balanced LNA
with hybrid
couplers: 3×
better
matching.

AUG, 2026
FABRICATION
PCBs on RT-
duroid 6002,
wire bonding,
Aluminium
packaging.

CURRENT STATUS
Room-temperature
measurement
under way; 15 K
validation next.



Prof. Karun
Rawat
IIT Roorkee



Dr. Aditya Pal
Research
Associate
IIT Roorkee



Dr. Pawan
Kumar Shukla
Research
Associate
IIT Roorkee



Mr. Ganesh
Bargaje
Research
Scholar,
IIT Roorkee



Prayog - QP

A Suite for quantum technologies

Live at prayog.swasth.org



PRAYOG - QP

(Platform for Research, Application and YOG of Quantum Phenomena)

Released Beta Version

[Qubit Characterization - Energy Bands and Transport Spectroscopy Simulations for different Qubit Platforms](#)

[TBWeb - Generate Tight Binding Hamiltonian based on Slater-Koster Method from DFT](#)

[Quantum Tetris - Learn Principles of Quantum Physics via gaming](#)

Under Development

Measuring T1 Relaxation times for Qubits - Monte Carlo Simulations of Single Shot Readout

BerryWeb - Estimate Berry Curvature based Material Properties



Developed at the Quantum Materials and Devices Hub,

established under the National Quantum Mission,

Department of Science and Technology, Govt of India

INNOVATION OVERVIEW

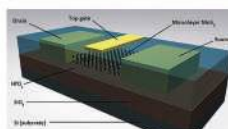
PROBLEM: An integrated software suite for all things quantum with applications spanning quantum computing all the way to quantum materials and devices is missing

SOLUTION: A cloud-based platform which provides researchers with an easy interface to characterize devices by estimating quantum device parameters and run simulations for various quantum phenomena, e.g. quantum transport, T1 relaxation, T2 relaxation.

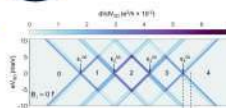
KEY BREAKTHROUGHS

- Developed computation methodology for generating energy levels for Single Quantum Dots in different materials (e.g. 2D, Si, Ge)
- Developed quantum transport simulations to replicate transport spectroscopy experiments in different materials (e.g. 2D, Si, Ge)
- Developed T1 relaxation simulations to replicate Elzerman readout in multi-state quantum dots in 2D materials
- Developed method to define a Hamiltonian based on Slater-Koster method from DFT calculations for 2D materials
- Developed a Tetris game to teach principles of quantum computing

SECTOR IMPACT



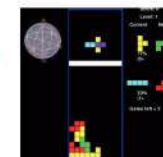
Quantum Transport



Qubit Spectroscopy and Readout



Quantum Materials Properties



Quantum Pedagogy via gaming Q-Tetris (Pat applied)

MILESTONES & STATUS

AUG, 2024
Platform Conceptualized

AUG, 2025
TBWeb for graphene released

FEB, 2026
Parameter based Energy Band generation for Single Quantum Dots (SQDs) in (i) 2D materials, (ii) Si, (iii) Ge release

APR, 2026
Parameter based Transport Spectroscopy simulation platform for SQDs in all materials release

SEP, 2026
Q-Tetris patent filed and software release

CURRENT STATUS
Making TBWeb work for other materials besides Graphene



Prof. Bhaskaran Muralidharan
IIT Bombay

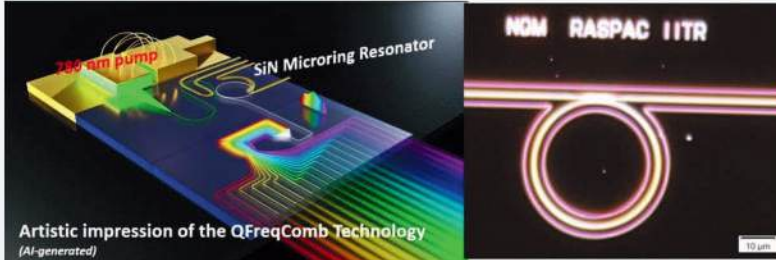


Dr. Sundeep Kapila
Project Scientist,
IIT Bombay



TG3, RASPAC

Quantum Devices from Quantum Minds



INNOVATION OVERVIEW

PROBLEM: Existing quantum photonic systems require complex, bulky and expensive multi-laser sources and secure random-number generation

SOLUTION: TG-3 develops compact integrated quantum frequency comb waveguides and quantum random number generators (QRNGs) to enable high-speed quantum photonic application

KEY BREAKTHROUGHS

- **Integrated Quantum Comb Waveguide:** Compact photonic waveguide platform.
- **Scalable Quantum Photonics:** Replaces bulky architectures with an integrated, chip-compatible solution for quantum technologies.
- **High-Speed Quantum Randomness:** Quantum Random Number Generator (QRNG)/ TRNG
- **Indigenous Quantum Hardware:** Compact, scalable and cost-effective solution.



SECTOR IMPACT

CYBER SECURITY

Quantum-safe encryption and secure communication

COMPUTING

Scalable quantum and photonic computing platforms

COMMUNICATION

High-capacity quantum networks and optical interconnects

SOVEREIGNTY

Indigenous quantum-photonic hardware and reduced import dependence

MILESTONES & STATUS

TECHNOLOGY
Waveguide & nonlinear photonics

PROTOTYPE
Frequency Comb

PRODUCT 1
Quantum Frequency Comb Squeezed Frequency Comb

PRODUCT 2
Quantum random number generator

VALIDATION
Application testing

MARKET



Prof. S. K. Varshney,
IIT Kharagpur



Prof. Rajesh Kumar,
IIT Roorkee



Prof. Anshuman Kumar,
IIT Bombay



Quan2D Technologies

Transforming tomorrow with Quantum and Nano Innovation

INNOVATION OVERVIEW

PROBLEM: Quantum sensing technologies, especially high-performance single-photon detectors, remain largely import-dependent and costly. Limited access to compact, scalable sensors is slowing wider adoption of quantum technologies.

SOLUTION: Quan2D is developing indigenous SNSPD-based quantum sensing technologies using advanced quantum materials and nanofabrication. Our systems enable high-performance, cost-effective solutions for quantum communication, imaging, metrology and sensing.

KEY BREAKTHROUGHS

Indigenous end-to-end SNSPD system, integrating detector, cryogenic and optical subsystems for quantum applications. Indigenous SNSPD chip and readout electronics, enabling greater control over device performance, system integration and scalability. Localized serviceability and modular architecture, significantly reducing system downtime and enabling faster maintenance and turnaround.

SECTOR IMPACT

QUANTUM COMMUNICATION

Secure • High-Speed • Long-Range

QUANTUM COMPUTING

Photonics • Readout • Scalability

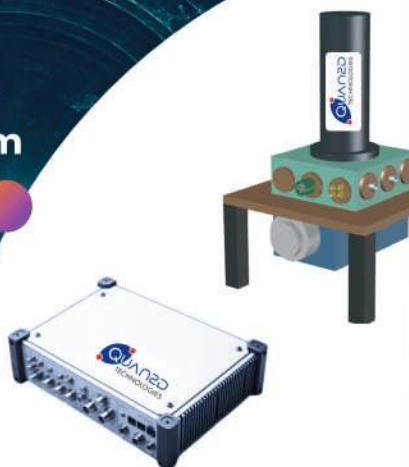
QUANTUM SENSING & METROLOGY

Ultra-Sensitive • Precise • Real-Time

SPACE & DEFENCE

Detection • Imaging • Strategic Autonomy

Superconductivity based Single Photon Detector for Quantum Applications



MILESTONES & STATUS

2024-2026
Material & chip development:
Superconducting film and reflective mirror development

2024-2025
Device fabrication:
Meander nanofabrication, superconductivity characterization

APR-JAN, 2025,26
System design & fabrication:
SNSPD system design, hardware fabrication

JAN-SEP, 2026
Cryogenic/RF integration:
Systemization, integration of cryogenics and RF components

JUN-NOV, 2026
Integrated system - MVP:
Optical integration to cryogenics, thermal stability tests

CURRENT STATUS
Integrated prototype, measurement electronics optimization in progress



Arindam Ghosh
Co-founder, Chairman



Gayathri H N
Co-founder, CEO



Samir Saraff
Co-founder, Business Head



Qwanastra

A Quantum and Photonics Innovation Company



CONNECT WITH US

INNOVATION OVERVIEW

PROBLEM: India's quantum communication and sensing programs remain heavily dependent on imported single-photon detectors, cryogenic systems and specialist photonic hardware.

SOLUTION: TG-3 develops compact integrated quantum frequency comb waveguides and quantum random number generators (QRNGs) to enable high-speed quantum photonic application

KEY BREAKTHROUGHS

1. **INDIGENOUS SNSPD SYSTEM:** Integrated detector, cryostat, fibre interfaces, RF/DC feedthroughs and readout electronics developed as a complete platform.
2. **HIGH-PERFORMANCE DETECTION:** Targeting >80–85% photon detection efficiency at 1550 nm, ≤ 100 Hz dark-count rate and < 50 –60 ps timing jitter.
3. **SCALABLE ARCHITECTURE:** 2-channel platform developed, with a roadmap to 8–16 channels and ultimately up to 64 channels.
4. **BROADER DETECTOR ROADMAP:** Variants for 810/1550 nm, free-space operation, polarization-independent detection and future mid-IR applications.

SECTOR IMPACT

QUANTUM COMMUNICATION

Enables QKD, quantum networks and secure optical links.

QUANTUM COMPUTING

Supports photonic quantum computing and multi-channel photon detection.

QUANTUM SENSING

Ultra-low-light detection for LiDAR, spectroscopy and advanced sensing.

INDIGENOUS HARDWARE

Reduces import dependence and builds domestic cryogenic-photonics capability.

MILESTONES & STATUS

OCT, 2024
Rs 3 Cr,
Government
Grant
Confirmed

T0 - AUG, 2025
Rs 3 Cr,
Government
Grant In Bank
Account

T0 - 6 Months
MVP Ready

T0 + 24 Month
Ready for field
Deployment

**T0 + 12 Month
CURRENT STATUS**
At Least 2 Systems
Shipped to buyers



Vidur Raj
Director



Ajay K Sao
UHV Tech Lead



Anand Mohan
Electronics
Tech Lead





QUANTUM SENSING & METROLOGY

*REDEFINING PRECISION THROUGH QUANTUM-ENABLED
SENSING AND MEASUREMENT*

QUANTUM TECHNOLOGY LANDSCAPE





QuBeats

Quantum Sensing and Lasing
Company



CONNECT WITH US

QUANTUM GYROSCOPE



INNOVATION OVERVIEW

PROBLEM: Conventional gyroscopes (MEMS, fiber-optic, ring laser) accumulate angular drift error over time - meaning the longer you operate without GPS, the more your heading/position estimate drifts off. This makes them unreliable for long-duration missions in GPS-denied environments

SOLUTION: The co-magnetometer gyroscope uses coupled atomic spins to sense rotation with zero long-term drift, enabling accurate, drift-free navigation for extended periods without any external reference signal like GPS.

KEY BREAKTHROUGHS

QuBeats is developing an indigenous drift-free quantum gyroscope by leveraging coupled alkali atomic spins in a co-magnetometer configuration, enabling ultra-accurate rotation sensing without accumulating error that plagues MEMS and fiber-optic systems. This hardware is integrated into a full-stack Quantum Positioning System combining miniature atomic clocks, and proprietary ML-driven sensor fusion algorithms for navigation accuracy in GPS-denied environments. A critical innovation is the platform's SI traceability and ability to self-correct, enabling direct deployment on military vehicles, drones, and maritime vessel.

SECTOR IMPACT

DEFENCE

GPS-denied navigation for submarines, naval ships, and UAVs;

SELF DRIVING VEHICLES

Self driving vehicles require high precision gyroscopes like Co-magnetometer

SPACE

Satellite attitude determination and control, spacecraft orientation in deep-space mission

SCIENTIFIC RESEARCH

Testing fundamental physics (e.g., measuring Earth's rotation, Lorentz invariance tests), geodesy

MILESTONES & STATUS

APR, 2023

QuBeats founded by team from Max Planck, JQI, MIT/Harvard.

OCT, 2025

Won ADITI 2.0 Defence Challenge; secured ₹25 Cr IDEX grant for Indian Navy QPS

DEC, 2025

Working prototypes validated; first commercial trials from defence & aerospace.

MAR, 2025

Closed \$12M institutional funding round (Zoho, Indusbridge, NQM equity)

JUN, 2025

Selected for Amaravati Quantum Valley; collaboration with TIFR Hyderabad.

CURRENT STATUS

Lab prototypes validation; optics packaging under development; Indian Navy trials from September '26



Rajat Sethi
CEO &
Managing
Director



Shouvik
Mukherjee
Chief Scientist



Mallikarjun
Karra
Chief of
Operations



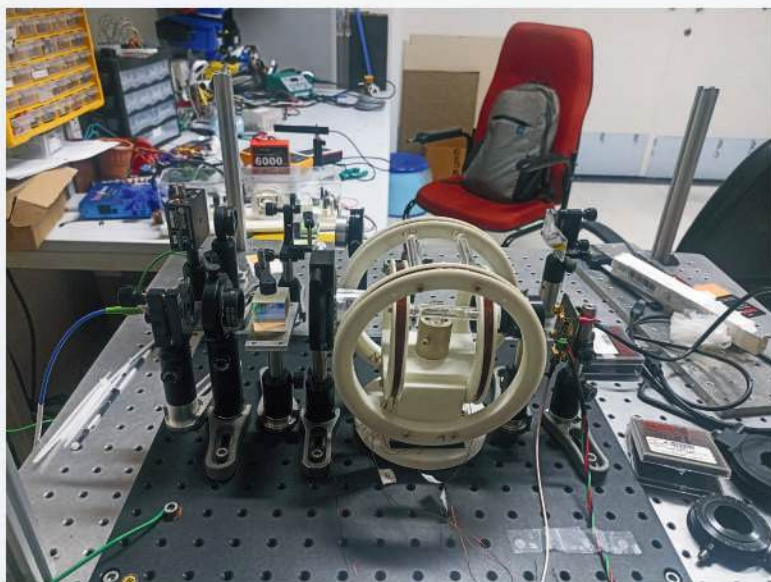
CONNECT WITH US



QuBeats

Quantum Sensing and Lasing Company

QUANTUM MAGNETOMETER



INNOVATION OVERVIEW

PROBLEM: GPS-dependent navigation is vulnerable to jamming, spoofing, and signal denial, while existing magnetic sensors lack the sensitivity to reliably map Earth's geomagnetic anomalies for autonomous positioning.

SOLUTION: A compact, frequency-modulated NMOR quantum magnetometer that detects magnetic fields with sub-picotesla precision, enabling resilient, GPS-denied navigation by reading natural geomagnetic signatures

KEY BREAKTHROUGHS

Demonstrated sub-pT sensitivity in a portable NMOR architecture; validated for geomagnetic navigation use cases; selected under India's ADITI 2.0 program to develop a sovereign Quantum Positioning System for naval operations.

SECTOR IMPACT

DEFENCE

GPS-denied navigation for submarines, naval ships, and UAVs;

MAGNETIC ANOMALY DETECTION

Quantum Magnetometer improves anomaly detection capability for anti submarine warfare

NON DESTRUCTIVE TESTING

Structural health monitoring using magnetic flux sensing

MINERAL EXPLORATION

The subtle magnetic variations help estimation of mineral deposits.

MILESTONES & STATUS

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CEO & Managing Director



Shouvik Mukherjee
Chief Scientist



Mallikarjun Karra
Chief of Operations



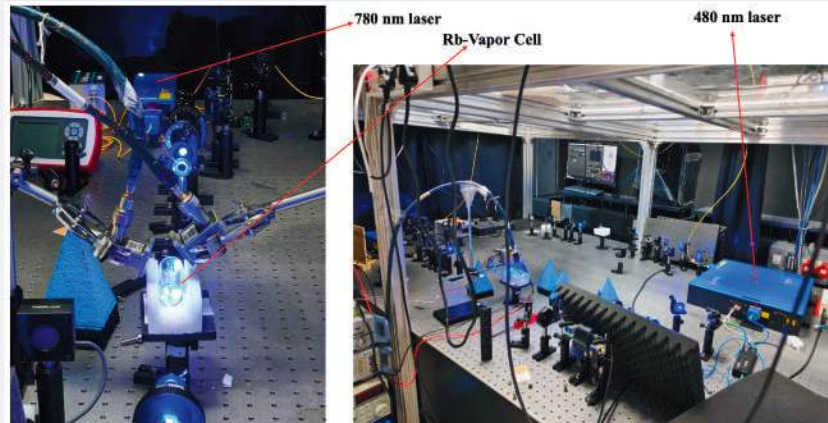
QuBeats

Quantum Sensing and Lasing Company



CONNECT WITH US

RYDBERG RF RECEIVER



INNOVATION OVERVIEW

PROBLEM: Conventional RF receivers require multiple antennas and hardware to cover broad spectra, suffer from limited sensitivity, and are vulnerable to interference, saturation, and jamming creating gaps in electronic warfare, communications, and spectrum monitoring.

SOLUTION: A single, ultra-wideband Quantum Rydberg RF receiver that natively senses electric fields from 50 MHz to 170 GHz without switching hardware, delivering quantum-limited detection across the entire range.

KEY BREAKTHROUGHS

One Rydberg sensor covers 50 MHz–170 GHz continuously; atomic-scale sensitivity without traditional front-end electronics; inherently calibrated to SI units; highly resistant to overload, damage, and jamming compared to semiconductor receivers. Such ultra wideband has been achieved by only a very few teams globally.

SECTOR IMPACT

Electronic Warfare & Signals Intelligence (SIGINT);



Wideband Spectrum Monitoring & Cognitive Communications



Passive Radar & Covert Sensing



Secure Communications in Contested Environments

MILESTONES & STATUS

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Rajat Sethi
CEO & Managing Director



Shouvik Mukherjee
Chief Scientist



Mallikarjun Karra
Chief of Operations



SCAN ME



Orvis Semi Private Ltd

We care to Innovate

INNOVATION OVERVIEW

PROBLEM: In Fluorescence Lifetime Imaging Microscopy (FLIM), dyes emit photons with lifetimes in the nanosecond range, and precise measurement requires extremely sensitive detectors and robust analysis.

SOLUTION: Innovations like SPAD-based widefield FLIM are helping overcome these barriers, making dye decay imaging more robust and clinically relevant.

KEY BREAKTHROUGHS

Orvis has pioneered indigenous CMOS-SPAD fabrication, establishing self-reliance in advanced photonics and positioning India at the forefront of photon-counting innovation. The designs deliver enhanced sensitivity with reduced dark counts, enabling precision in ultra-low-light environments. Notably, Orvis became the first in the country to develop an array-based SPAD detector for defense applications, now being redesigned for quantum systems. With picosecond temporal resolution, these SPADs unlock high-speed imaging capabilities, advancing both strategic defense technologies and biomedical research.

SECTOR IMPACT



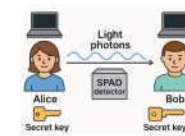
BIOMEDICAL: Fluorescence Lifetime Imaging Microscopy and diagnostic probes.



QUANTUM COMMUNICATIONS: uncompromised security in communication networks



DEFENSE AND AEROSPACE: EO/IR seekers and low-light missile guidance system



CRYPTOGRAPHY: Quantum Key Distribution (QKD) over optical fiber or free-space links

MILESTONES & STATUS

APR, 2026
Project started

AUG, 2026
Sensor design completed and ready to be fabricated

DEC, 2026
Expected to receive the silicon dies and begin the characterization of the sensor

MAR, 2027
Design a camera system with custom SPAD developed for end use testing

JUL, 2027
Functional testing of SPAD camera - field testing

OCT, 2027
Product ready for launch



Mukul Sarkar
CTO, Prof. IIT
Delhi



Monisha Sarkar
CEO



Akhlesh Rajak
Analog
Designer



Gargi Nandi
Analog
Designer

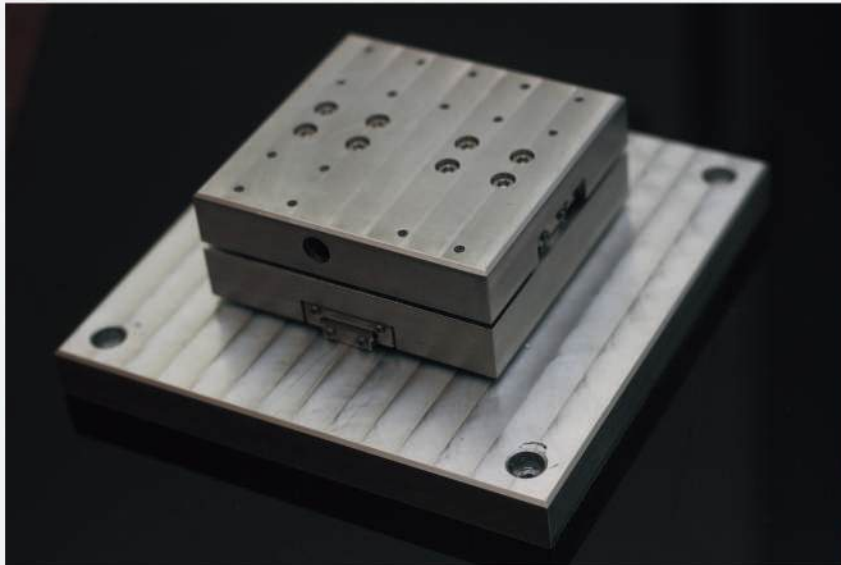


BUMBLEBEE INSTRUMENTS PVT. LTD.

Developing state-of-the-art instrumentation for
research and education, with a focus
on quality and innovation.



CONNECT WITH US



INNOVATION OVERVIEW

PROBLEM: Conventional motion stages lack nanometer precision and suffer from backlash, requiring compact, indigenous nanopositioning solutions for advanced quantum and scientific applications.

SOLUTION: Bumblebee Instruments is developing modular piezoelectric stick-slip nanopositioning stages for precise, repeatable motion in quantum sensing, microscopy, probing and optical alignment applications.

KEY BREAKTHROUGHS

1. Developed an indigenous piezoelectric stick-slip nanopositioning mechanism capable of converting high-frequency piezoelectric actuation into controlled incremental motion. Achieved nanometer-scale step positioning while retaining the potential for comparatively large travel through accumulated steps.
2. Developed compact precision mechanical architecture integrating the piezo actuator, preload and motion-guiding mechanism. Integrated electronic drive and embedded control for repeatable step generation and bidirectional positioning.

SECTOR IMPACT

QUANTUM SENSING

Precision positioning of probes, samples and sensing elements

SEMICONDUCTORS

Fine positioning for wafer probing & device characterization

MICROSCOPY

Nanometer-scale positioning of samples and probes for high-resolution microscopy.

PHOTONICS & OPTICS

Precision alignment of optical components, lasers and photonic devices.

MILESTONES & STATUS

FEB, 2024
Bumblebee Instruments founded Company established and scientific-instrumentation R&D initiated.

AUG - DEC, 2024
Precision Motion R&D Precision mechanical and motion-platform capabilities developed.

JAN - DEC, 2025
System Integration Piezo actuator, mechanics, drive electronics and embedded control integrated.

JAN - AUG, 2026
Prototype Validation Nanometer-scale motion stage validated toward TRL 7/8.

CURRENT STATUS
TRL 7/8 Product launch shortly



Dr. Arvind
Ajoy



Abhinav
Rajeev



Ananthu
Sasikumar



CONNECT WITH US



P-Quest IIT Bombay |
QV Sensor Technologies Pvt Ltd



Driving Innovation in Quantum Sensing
and Metrology at IIT Bombay



INNOVATION OVERVIEW

PROBLEM: Unshielded ambient operation introduces severe noise and drift issues in state-of-the-art diamond sensors. Introduces severe errors in navigation applications

SOLUTION: A hardware-independent, software-defined architecture combining an adaptive loop with Eigen Formalism to eliminate technical noise and thermal drift completely

KEY BREAKTHROUGHS

- **Adaptive Digital Balancing:** Our patented adaptive algorithm continuously corrects path gain errors to eliminate laser noise leakage
- **In-Situ Lineshape Correction:** Dynamically normalizes the real time signal distortion
- **Software Magnet Drift Removal:** Our patented Eigen-algorithm isolates and suppresses non-linear thermal drift purely in software
- **Observatory Field Validation:** Proven under harsh ambient conditions, achieving unshielded, sub-nanotesla vector field tracking

SECTOR IMPACT



NAVIGATION:
Drift-free vector tracking for GPS-denied inertial navigation



MAGNETIC SURVEYING:
Unshielded field probes for geomagnetic surveying



DEFENCE:
Tactical sub-surface tracking arrays



SPACE:
Suitable for long-term space mission

MILESTONES & STATUS

FY 2024-25 GRANT:
National Quantum Mission funds received.

DEC, 2025 PROTOTYPE:
First lab-based Quantum sensor prototype developed

MAR, 2026 PATENT:
Comprehensive patents filed via IITB IRCC

JUN, 2026 SENSITIVITY:
Vector operation in unshielded env with 300 pT/ $\sqrt{\text{Hz}}$

AUG, 2026 LONG-TERM STABILITY:
Eliminated path gain errors and magnet drifts

CURRENT STATUS FIELD-READINESS:
Sep 2026 – First real field operation in unshielded operations



Prof. Kasturi Saha
Project Director



Prof. Siddharth Tallur
Project Investigator



Dual Head Hot Atomic Magnetometer

Dead-zone-free quantum magnetic sensing for
navigation, surveying and defence



CONNECT WITH US

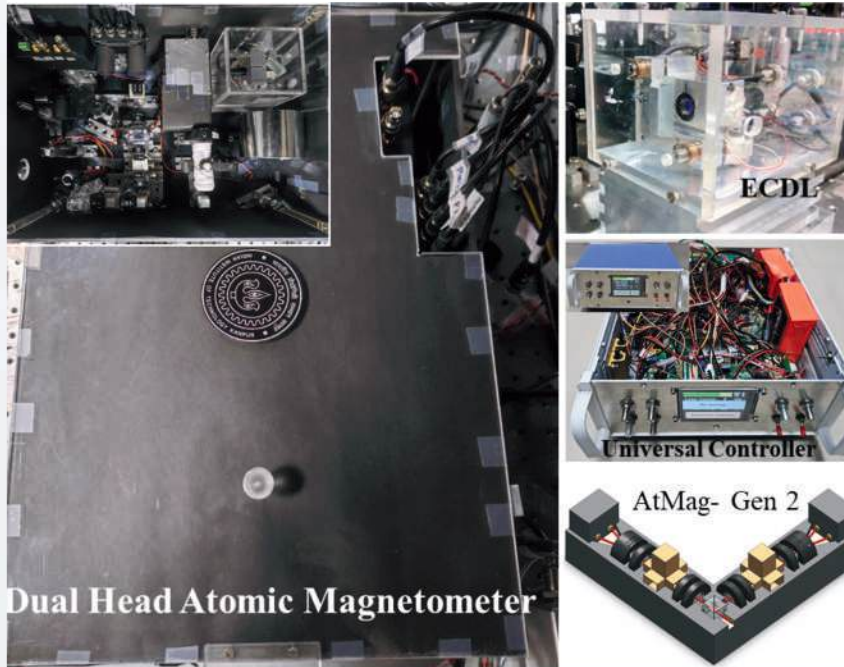
INNOVATION OVERVIEW

PROBLEM: Dependence on imported atomic magnetometers and orientation-dependent dead zones and heading errors limit reliable magnetic sensing on mobile platforms.

SOLUTION: Dual-head Rb magnetometer with complementary sensing, optical control and FPGA processing for dead-zone-free operation.

KEY BREAKTHROUGHS

- **Dual-head Rb architecture** for dead-zone reduction.
- **Indigenous ECDL & laser stabilization** for atomic-state control.
- **Integrated control electronics** for laser, cell heating & detection.
- **FPGA-based resonance tracking & DSP** for real-time measurement.
- **pT-level prototype demonstrated**; patent filed.



SECTOR IMPACT

Magnetic Anomaly
Detection,
Surveillance,
UXO Detection



Magnetic Navigation,
Positioning, Guidance



Mineral Exploration,
Geological Mapping



UAV Surveying, Marine
Surveying

MILESTONES & STATUS

DEC, 2024
NQM Initiation,
Indigenous
Magnetometer
Development

JUN, 2025
ECDL, Optical
System, Control
Electronics

SEP, 2025
First Rb Hot-Atom
Magnetometer
Prototype

JAN, 2026
PLL Resonance
Locking, Frequency
Tracking

MAR, 2026
FPGA Control,
Real-Time DSP

CURRENT STATUS
Dual-Head
Magnetometer, pT-
Level Sensitivity,
Patent Filed



Saikat Ghosh,
Associate
Professor,
LPI



Amitangshu
Pal, Assistant
Professor, MPI



Soumik
Karmakar &
Shyamsundar
Maity, PhD
Student



Vijay Kumar
Yadav, Senior
Technical
Superintendent



CONNECT WITH US



Quantum Imaging TG, IIT Kanpur



INNOVATION OVERVIEW

PROBLEM: Researchers building quantum sensing and imaging systems rely on image rotators (K-mirrors) for OAM spectrum measurement via angular-coherence interferometry. Every rotation changes polarization by 30–55%, degrading interferometric visibility and quantum state measurement fidelity.

SOLUTION: Developed a polarization-preserving image rotator: two half-wave plates before and after a K-mirror, rotating at half its angle, making polarization independent of rotation. Validated with just 1% polarization change.

KEY BREAKTHROUGHS

Complete elimination, not just reduction, of rotation-induced polarization change in a K-mirror, for any base angle or mirror coating. Achieved 1% mean polarization change experimentally, versus 30–55% for commercial K-mirrors and 3–10% for the best prior mitigation. Validated via Stokes-parameter measurements across full 0° – 360° rotation; IP disclosure filed with IIT Kanpur.

SECTOR IMPACT

HEALTHCARE

Non-invasive diagnostic and biomedical imaging with improved measurement precision.

SPACE IMAGING

Accurate image derotation and polarimetric measurement for astronomical systems.

LOGISTICS

Clearer imaging through fog for improved object detection and tracking.

DEFENCE & REMOTE SENSING

Reliable target discrimination and surveillance in GPS-denied environments.

MILESTONES & STATUS

MAY, 2025
Theoretical framework proved rotation-independent polarization via Jones-matrix analysis.

MAY, 2025
Device designed and initial testing conducted for the rotator.

JAN, 2026
Home-built prototype assembled with synchronized half-wave plates.

MAR, 2026
Lab-scale validation via Stokes-parameter measurements across full rotation.

APR, 2026
Patent (IP disclosure) filed with IIT Kanpur.

CURRENT STATUS
TRL 5, prototype validated; 1% mean polarization change achieved.



Prof. Anand Kumar Jha
Professor, Lead PI



Dr. Suman Karan
Sr. Executive Officer



Aman Srivastava
UG Student, IITK



Pratham Todkar
UG Student, IITK

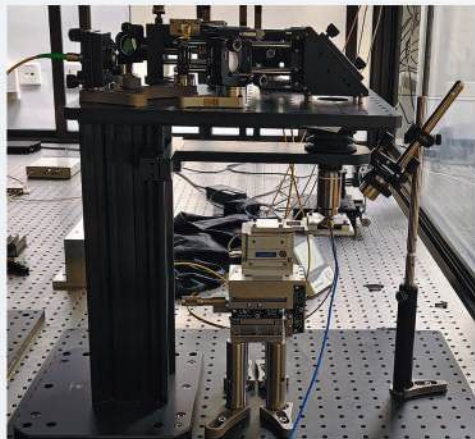


Compact confocal scanning microscope for material analysis

Dr. Phani Kumar Peddibhotla's group,
IISER Bhopal



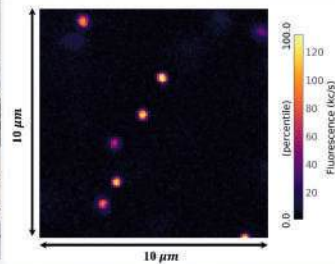
CONNECT WITH US



Compact scanning NV confocal microscope setup



Electronic grade diamond containing single NV defects



Confocal scan of electronic grade diamond showing single NV centers

INNOVATION OVERVIEW

PROBLEM: Imported confocal microscopes are expensive and proprietary, limiting customization and access. India needs a robust, cost-effective indigenous platform for high-resolution advanced research and industrial material characterization applications.

SOLUTION: Developed a compact, confocal microscope for fluorescence imaging, NV-diamond characterization and material analysis, successfully demonstrated in research and deployed at a diamond factory in Surat.

KEY BREAKTHROUGHS

- Developed a compact scanning confocal microscope with an approximately 0.5 m × 0.5 m footprint
- Demonstrated spatially resolved fluorescence imaging of electronic-grade diamond containing individual nitrogen-vacancy centers.
- Installed and commissioned the system at BTPL, Surat, where it produced satisfactory confocal scans of laboratory-grown diamond under factory conditions.

SECTOR IMPACT



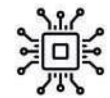
Diamond fabrication



Materials, photonics and quantum sensing research



Biosciences and pharma



Semiconductor inspection

MILESTONES & STATUS

APR, 2025

Compact 0.5 m × 0.5 m optomechanical prototype designed and assembled..

MAY

MoU signed between IISER Bhopal (Dr. Phani Peddibhotla as lead) and BTPL Technologies Pvt. Ltd. Surat for installation of the confocal setup.

MAY, 2026

Confocal microscope installed and commissioned at BTPL, Surat and personnel trained.

CURRENT STATUS

Factory-produced diamond samples scanned successfully under operational conditions.



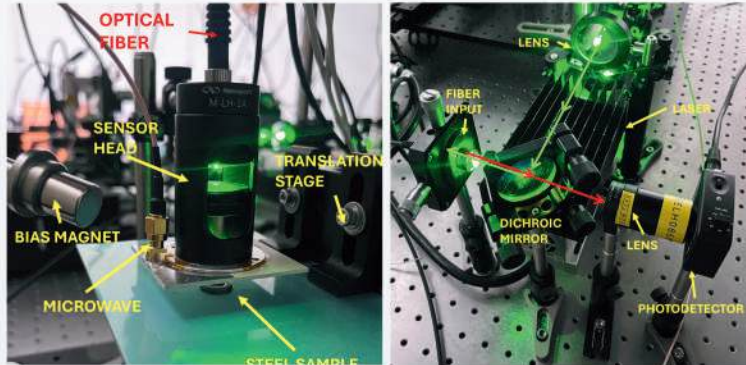
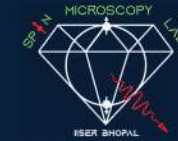
Dr. Phani Kumar Peddibhotla
Associate Professor, IISER Bhopal



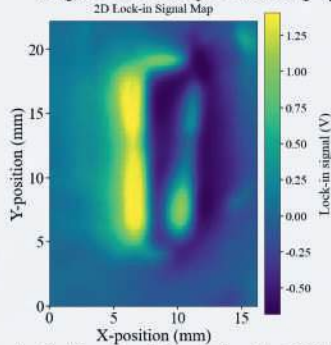
CONNECT WITH US



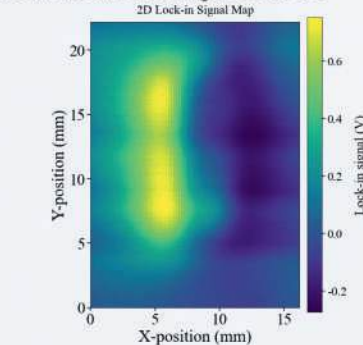
Quantum Diamond Magnetometry Platform for Steel Defect Imaging



High sensitivity scanning quantum diamond magnetometer



Magnetic field map of the defect in SS316 without Aluminium sheet on top.



Magnetic field map of the defect in SS316 with 2 mm thick Aluminium sheet on top.

INNOVATION OVERVIEW

PROBLEM: Steel and iron components require reliable defect detection. Conventional methods often require contact, surface preparation or radiation safety, creating demand for sensitive, non-contact magnetic imaging under ambient conditions.

SOLUTION: Developed a non-contact quantum diamond magnetometer that maps magnetic fields to detect steel defects under ambient conditions, including through 2–3 mm aluminum sheets.

KEY BREAKTHROUGHS

- Developed a scanning quantum diamond magnetometer that generates spatial maps of defect-induced magnetic stray fields under ambient laboratory conditions.
- Demonstrated non-contact imaging of an artificial machined defect in steel, both uncovered and beneath a 2mm-3mm non-magnetic aluminium sheet.
- Achieved approximately 2–3 nT/√Hz magnetic sensitivity in the 10–100 Hz band and approximately 0.5 mm magnetic spatial resolution.

SECTOR IMPACT



Oil and gas refineries and pipelines.



Railways Inspection of rail tracks and critical steel components



Steel, power and process plants



Non-destructive testing services



MILESTONES & STATUS

MAR, 2025
Steel-defect imaging prototype development initiated.

MAY
Presented quantum diamond magnetometry and its application at CLEO 2025

JAN, 2026
Laboratory scanning prototype operated successfully under ambient conditions

JULY
Defect-induced magnetic signature detected through a 2 mm aluminum sheet.

SEPTEMBER
Testing for temperature robust mapping of the magnetic field of the sample under investigation

CURRENT STATUS
Patent filing and discussions for industrial sample validation initiated.



Dr. Phani Kumar Peddibhotla
Associate Professor, IISER Bhopal



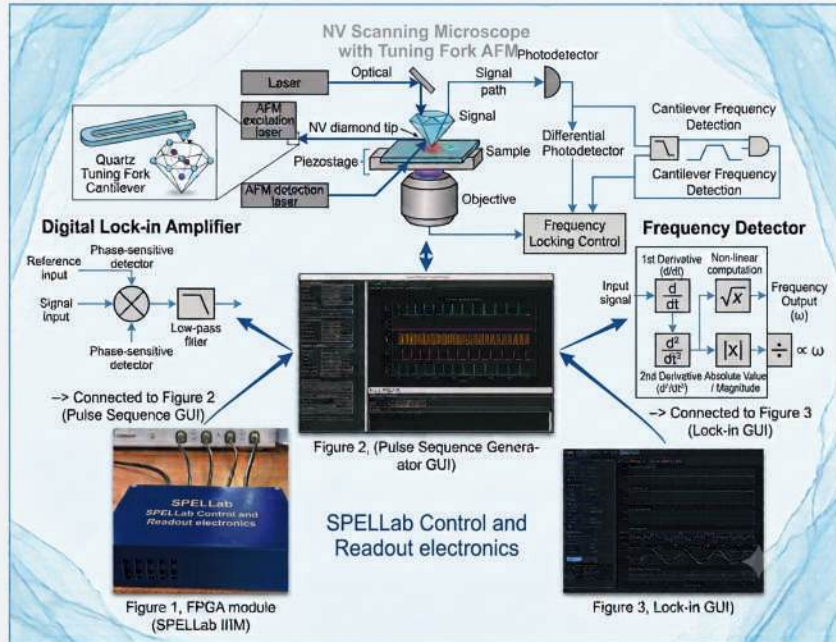
SPELLAB and QV Sensor technology LTD



Spin the future and light the way for quantum technologies



CONNECT WITH US



INNOVATION OVERVIEW

PROBLEM: control and readout electronics are crucial for the development of quantum devices and technologies. atmanirbhar and cost-effective solutions for these are needed.

SOLUTION: Developed some important parts of control and read-out electronics based on FPGA. these are targeted for immediate need in scanned probe nv microscopy but can be more widely applied in many other measurement systems.

KEY BREAKTHROUGHS

- Multi-channel pulse generator for Quantum control sequences developed
- Dual phase lock-in amplifier with pll developed
- Frequency counter (based on double derivative technique) with ppb resolution developed

SECTOR IMPACT



Quantum Control, Quantum Measurements



Low-noise measurements, cost effective



Freq. Detection for Scientific measurements



Scanned probe microscope controller

MILESTONES & STATUS

JUL, 2018
Lab Founding

SEP, 2021
First scientific demo of pulse sequence generator (trl-3)

OCT, 2025
TRL 4-5
Demonstration of pulse sequence generator and frequency detector,

JAN, 2026
TRL 4-5
Demonstration of lock-in,

CURRENT STATUS
Three Instruments are available at TRL 6 level and being benchmarked against commercial products



Praveen Bhallamudi
Lab PI, Co-Director of the Start-Up



Praveen Hegde
Ph.D. Scholar, Team Lead



Suthintraraj
UG Student, FPGA programming



Gautam, UG Student, FPGA Programming



CONNECT WITH US



SPELLAB and QV Sensor technology LTD



Spin the future and light the way for quantum technologies

INNOVATION OVERVIEW

PROBLEM: India is lacking indigenously developed products in the critical technology of high-sensitivity room temperature portable magnetometer

SOLUTION: Developed an NV-Diamond based magnetometer in a field deployable configuration, with the sensor chip made in india and other parts designed and assembled in india.

KEY BREAKTHROUGHS

Funding secured for development of magnetometer ~ 300 pt/ $\sqrt{\text{Hz}}$ sensitivity demonstrated in prototype (in lab) Vector magnetometry and temperature compensation achieved Sensor head battery operated 19" rack module Flux-concentrator design demonstrated 1st phase of ai/ml training for object identification completed Drone testing initiated

SECTOR IMPACT



GNSS/GPS Denied PNT



Aerospace & Navigation,
Precise Inertial Mapping,



Geophysical and Mineral
Exploration



Biomedical Applications,
MEG & MCG

MILESTONES & STATUS

JUL, 2018
Lab Founding

JUL, 2019
First scientific
Demo of ODMR,
TRL-2

AUG, 2022
Lab-scale
Sensing DEMO
TRL 3-4

JUL, 2024
Field
deployable
compact
magnetometer
project initiated

SEP, 2025
Wall-Plugged
Prototype

CURRENT STATUS
Field-deployable
unit made, trl-5,
startup founded



Praveen Bhallamudi
Lab PI, Co-
Director of the
Start-Up



Praveen Hegde
Ph.D. Scholar,
Team Lead



Tamizhkanalr amesh
Project
Associate



Monish raghav p
Project
Associate



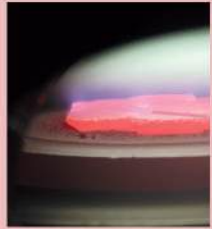
India Centre for Lab Grown Diamond (InCent-LGD), IIT Madras

Custom NV-diamond materials for quantum sensing



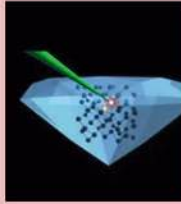
CONNECT WITH US

Process for NV center creation



CVD Growth

Single-crystal
diamond via
MPCVD; isotopic
 ^{12}C control with
Nitrogen doping



Defect Engineering

e-beam
irradiation for
vacancy
creation in
Diamond



Annealing

Annealing
At 800-1000°C
for NV
formation

INNOVATION OVERVIEW

PROBLEM: Researchers need customized NV-diamond samples, but face high cost, 4-6 month lead times, limited customization and quality variation.

SOLUTION: Researchers need customized NV-diamond samples, but face high cost, 4-6 month lead times, limited customization and quality variation.

KEY BREAKTHROUGHS

Successfully achieved 2 ppm nitrogen-doped CVD diamond as the starting material. Successfully created NV centers through electron irradiation and thermal annealing. Achieved 210 ppb NV concentration in the diamond. Established a controlled NV-creation process from nitrogen incorporation → vacancy creation → annealing → NV formation. Verified NV-center formation using EPR/ODMR and optical characterization.

SECTOR IMPACT



Custom NV-Diamond
for Quantum Sensing



Academia & National Labs



Defence & Navigation



Quantum Sensing &
Magnetometry

MILESTONES & STATUS

MAY '23 - APR '24
Setting-up Centre
for LGD, IITM-
Research Park.

MAY - SEP '24
Setting-up
facility for
commercially
brought
MPCVD units.

OCT '24 - DEC '25
Optimization of
process
parameters for
nitrogen doped
diamond (30ppb-
2ppm)

JAN - FEB '26
Vacancy
creation by e-
beam
irradiation and
annealing

MAR'26- TILL DATE
NV Center
Quantification and
Spin-Property
Characterization by
EPR and ODMR

CURRENT STATUS
Successfully (TRL -
6) demonstrated
NV-center creation
at the 210 ppb
level in CVD
diamond.



Prof. M. S.
Ramachandra
Rao
PI, InCent-LGD,
IIT Madras



Prof. S.
Sathyan,
PI, InCent-LGD,
IIT Madras



Dr. J. Rajeev
Gandhi
Research
Scientist



Mr. Nikhil C
Research
Engineer



Mr. Praveen
Patnaik
Research
Scholar



CONNECT WITH US

PRENISHQ Prenishq Pvt. Ltd.

For the Next Generation of
Precision Technologies



INNOVATION OVERVIEW

PROBLEM: Existing laser systems are expensive, bulky, power-hungry, and difficult to integrate. They require complex electronics and frequency-locking, limiting their scalability in photonics and quantum technologies.

SOLUTION: Develop compact, robust, low-cost, low-power and frequency-stable laser systems that can serve as reliable building blocks for next-generation photonic and quantum technologies

KEY BREAKTHROUGHS

- Indigenous, compact & high-precision diode lasers and narrow-linewidth ECDLs.
- Integrated electronics & frequency stabilization
- Next-generation quantum sensing & magnetometry

SECTOR IMPACT

QUANTUM TECHNOLOGY & RESEARCH

Quantum magnetometers, Atomic systems, precision measurement, and Quantum computing.

DEFENCE & SECURITY

GPS-denied navigation, Magnetic anomaly detection, and advanced sensing

EXPLORATION & INDUSTRY

Mineral exploration, Deep-sea exploration Geophysical mapping.

SPACE TECHNOLOGY

Precision navigation, Atomic sensing, spectroscopy, and Space-based instrumentation.

MILESTONES & STATUS

Months : 0
Founded (2022)
Spin-off from IIT Delhi's Cold Atom Quantum Technologies Lab.

Months : 24
Technology Development (2022-24)
Developed precision diode lasers, ECDLs, optics, electronics

Months : 39
Indigenous Laser Launch (2025)
India's first indigenous high-precision compact diode laser launched

Months : 49
Product Commercialization (2026)
Commercialization & Expansion | Opal & Agate laser platforms progressing toward wider adoption.



Dr. Bodhaditya Santra
CO-FOUNDER



Dr. Suranita Kanjilal
Co- FOUNDER



CONNECT WITH US



QuSyn Tech

Quantum for All, Together for Quantum

INNOVATION OVERVIEW

PROBLEM: Quantum State Tomography (QST) is essential for determining and validating quantum states. However, it is slow, measurement-heavy, and increasingly complex as quantum systems scale.

SOLUTION: Quantum State Interferographer (QSI) enables single-shot quantum state characterization, extracting complete state information from a single interferogram without changing measurement settings. This enables faster, resource-efficient, and scalable quantum state monitoring.

KEY BREAKTHROUGHS

Successfully achieved 2 ppm nitrogen-doped CVD diamond as the starting material. Successfully created NV centers through electron irradiation and thermal annealing. Achieved 210 ppb NV concentration in the diamond. Established a controlled NV-creation process from nitrogen incorporation → vacancy creation → annealing → NV formation. Verified NV-center formation using EPR/ODMR and optical characterization.



SECTOR IMPACT

QUANTUM COMPUTING & RESEARCH

- Faster State Characterization
- Qubit Validation
- High-Dimensional Quantum Systems
- Reduced Measurement Overhead

QUANTUM COMMUNICATION & NETWORKS

- State Monitoring
- Fiber-Transmission Diagnostics
- Quantum Network Characterization
- Rapid State Verification

QUANTUM SENSING & PHOTONICS

- Precision Polarization Characterization Real-Time Monitoring
- Photonic System Calibration
- Compact Quantum Instrumentation



Prof. Urbasi Sinha
Co-Founder



Prof. Aninda Sinha
Co-Founder



Siddhartha Nair
Finance & BD

MILESTONES & STATUS

2015: TRL 1
Basic principle established
Weak-Value Quantum-State Measurement
Phys. Rev. A 92, 052120 (2015)

2019: TRL 2
Concept formulated
Extended the concept to an interferometric architecture,
Physical Review A 99, 022111 (2019)

2020: TRL 4
Proof of Concept
Experimentally demonstration
Physical Review Letters 125, 123601 (2020)

2024: TRL 5
Prototype validated
Translated the laboratory setup into a plug-and-play system with software-based quantum-state reconstruction and reduced measurement complexity.

2026: TRL 6
System demonstrated for end-user applications



Ashwini Bhat
Operations



Dr. Kallol Sen
Co-Founder & Director



Dr. Debadrita Ghosh
Director



Dr. Saumya Ranjan Behera
Consultant





QUANTUM COMMUNICATION

*ENABLING SECURE INFORMATION EXCHANGE
THROUGH QUANTUM NETWORKS*



QUANTUM TECHNOLOGY LANDSCAPE





Secure Machines

Quantum-Safe Trust. Engineered
in India.



CONNECT WITH US

INNOVATION OVERVIEW

PROBLEM: Long-lived digital trust must survive the post-quantum transition as classical cryptography becomes vulnerable, demanding crypto-agility, technology independence, and sovereignty across critical security infrastructure

SOLUTION: An indigenous quantum-safe hardware security module (HSM) delivering a hardware root of trust with crypto-agility, secure architecture, and high-performance acceleration for critical digital infrastructure.

KEY BREAKTHROUGHS

Future-proof crypto-agility - architected for evolving cryptographic standards, enabling adoption of new algorithms and security requirements without redesigning the underlying trust platform.

Quantum-safe hardware acceleration - purpose-built hardware acceleration engineered for the computational complexity and performance demands of post-quantum cryptography.

FIPS-ready indigenous root of trust - end-to-end security architecture engineered toward FIPS 140-3 certification, establishing an indigenous trusted foundation for critical digital infrastructure

SECTOR IMPACT

SOVEREIGN AND CRITICAL INFRASTRUCTURE

Sovereign hardware root of trust protection for critical national systems

PKI AND TRUST SERVICES

Future-proof digital trust for the post-quantum era.

DIGITAL INTEGRITY

Quantum-safe protection for identities and credentials

INFRASTRUCTURE FINANCIAL

Resilient cryptographic trust for high-value financial systems

MILESTONES & STATUS

**NOV, 2024
FUNCTIONAL PQC
HSM**

First end-to-end functional prototype of Quantum-safe HSM.

**AUG, 2025
DEEPTech
RECOGNITION**

Nasscom emerge 50 for deep-tech cybersecurity innovation

**JUN, 2025
PQC CAVP
VALIDATION**

CAVP/FIPS-validated, fully hardware-accelerated PQC library.

**JUL, 2026
ENTROPY
VALIDATION**

FIPS ESV Validation with step-by-step conditioning.

**AUG, 2026
AADHAAR TEST
DEPLOYMENT**

External validation in a high-scale environment

CURRENT STATUS

NQM COHORT 3 Selected, FIPS 140-3 in progress



Satyamurthy
Konanur
Founder and CEO



Shreenivas Hegde
Co-Founder and
CTO



Anil T
Head - Products



Dr. Ravi h k
Senior Technologist



CONNECT WITH US



Quntrol Sphere

Distributed Quantum Computing

INNOVATION OVERVIEW

PROBLEM: QuntrolSphere aims to develop the technology for distributed quantum computing, connecting multiple quantum processors together

SOLUTION: The pain points are spread across critical breakthroughs in quantum communication, universal controller addressing multiple qubit modalities and distributed technology stack

KEY BREAKTHROUGHS

- QKD nodes for long and short distances.
- Hardware-trusted nodes for long-distance QKD.
- Time synchronisation solution.
- Electronics platform for photonics and superconducting controls.
- Measurement and instrumentation programmable platform.
- Hands-on primers for QKD and control electronics.

SECTOR IMPACT

QUANTUM COMMUNICATION

QKD networks, entanglement distribution, teleportation

CONTROL ELECTRONICS

Multi-modality universal controller, programmable instrumentation

QUANTUM COMPUTING

Computing platforms, transduction, quantum switch, load balancers

MILESTONES & STATUS

JUL, 2026

Time synchronisation
Ultra precise sync over 100+ Kms

OCT, 2026

White Rabbit in a daisy chain
October 2026 Open source adaptation of CERN's WR protocol

OCT, 2026

QKD nodes
Metro links
Long distance links

NOV, 2026

Hardware Trusted Relay
Gateway node for multi domain QKD network

MAR, 2027

Control electronics
QKD control RF/DAC frontends (PoC)

Primer Platform (Available)

QKD network primer
QKD digital twin
Qubit Control Primer (PoC)



Vaibhav Pratap Singh
Director (Technology)



Ashutosh Kumar Singh
Director (Science)



Mohd Razin Ashfaque
Director (Engineering)



Ashutosh Kumar Singh
Director (Projects)



AllSecureX

Sovereign Quantum-Safe Ecosystem for BFSI, Defence & Space



CONNECT WITH US



INNOVATION OVERVIEW

PROBLEM: Critical infrastructure remains vulnerable to quantum threats, fragmented cryptography, and non-sovereign security dependencies

SOLUTION: Sovereign, air-gapped security across quantum hardware, software and PQC unified in one platform.

KEY BREAKTHROUGHS

Quantum-native, sovereign defence architecture combining QEntropy quantum entropy & Root of Trust, VajraX quantum-secure communication, 8-hop infrastructure-level PQC, and autonomous Cognitive CBOM for cryptographic discovery and quantum-risk quantification. Built for fully air-gapped, on-premise deployment with deterministic-first on-device AI, multi-source quantum entropy, geospatial command intelligence, and 14+ patents across India and PCT.

SECTOR IMPACT



MILESTONES & STATUS

NOV, 2025
Founded & Core R&D:
Quantum Hardware and solution validation

FEB, 2026
Quantum Productization:
Validation from research to deployable product

JUL, 2026
14+ Patents:
Covering hardware, entropy, communication, and autonomous cyber defence.

AUG, 2026
Pre-Seed Funding:
Backed by Investor along with USA and Denmark partnership

SEP, 2026
IFSCA & BFSI Deployment:
Used by 7+ enterprises, implemented in National CII

CURRENT STATUS
Next Seed Round:
For establishment of Quantum Lab for scalable quantum systems



Himanshu Vohra
CEO & Founder



Gen Anil Chait
Strategic Defence Advisor



Manav Narang
Fintech Advisor USA
Commercialization



Hritika Verma
Implementation Partner



CONNECT WITH US

VAYUNX TECHNOLOGIES

Securing Today, Quantum-Safe tomorrow

Crypto-SPM | Cryptographic Security Posture Management

A NEW CATEGORY AND A FOUNDATIONAL STEP TOWARD PQC READINESS
Securing Today, Quantum-Safe tomorrow



INNOVATION OVERVIEW

PROBLEM: Cryptography is beyond algorithms. It is fragmented across discovery surfaces and interconnected elements algorithms, certificates, keys, RNG, protocols, configurations and trust relationships. Inventory or CBOM alone cannot show what must change, prioritize risk or safely execute a national PQC transition.

SOLUTION: Crypto-SPM transforms fragmented discovery into actionable security intelligence-from inventory and context through posture assessment and controlled remediation, while supporting a safe path toward PQC transition.

KEY BREAKTHROUGHS

- Evolved CBOM research into the Crypto-SPM category, extending cryptographic visibility beyond inventory.
- Multi-surface discovery across source, binary, runtime, TLS, APIs/containers, mobile and cloud.
- Unified cryptographic context, trust relationships, risk assessment and PQC readiness.
- Established Crypto-SPM as a new category—Cryptographic Security Posture Management extending cryptographic security beyond algorithms, inventory and CBOM.
- Positioned Crypto-SPM as a foundational step toward PQC readiness at the IIIT Allahabad Workshop on Quantum Communication and Information Security.
- Launched "Beyond Algorithms," the Crypto-SPM white paper with DSCI & Government of Telangana.
- Launched a free public TLS assessment, now used by multiple reputed organizations for cryptographic and PQC-readiness assessment.
- Assessment recommendations have contributed to significant improvements in TLS cryptographic posture and PQC readiness.
- Invited for workshops and engagements with reputed government and institutional stakeholders.
- Independent CERT-In empaneled VAPT completed.

SECTOR IMPACT

BFSI

RBI cyber-resilience, IT-governance and payment security requirements demand risk visibility. Crypto-SPM maps cryptography and trust dependencies, prioritizing remediation and PQC readiness to strengthen compliance, resilience and customer trust.

DEFENCE

Mission-critical and sovereign systems require controlled cryptographic assurance, including disconnected environments. Crypto-SPM establishes visibility, trust intelligence and prioritized remediation, strengthening resilience, operational assurance and PQC preparedness.

TELECOM

Telecom Cyber Security Rules and assurance obligations create mandatory cybersecurity requirements. Crypto-SPM identifies cryptographic exposure across networks, protocols and certificates, enabling risk prioritization, stronger assurance and PQC transition planning.

GOVT. & CRITICAL INFRA

CERT-In security guidelines establish prioritized cyber controls for government entities. Crypto-SPM provides cryptographic visibility, dependency analysis and prioritized remediation, strengthening governance, sovereign security, resilience and PQC preparedness.

MILESTONES & STATUS

JAN, 2025
VAYUNX incorporated; two engineering members.

PHASE 1 2025
Core engineering team established; CBOM research and cryptographic discovery platform development initiated

14 JAN 2026
Patent application #1 filed, advancing VAYUNX cryptographic security research and IP.

30-31 MAY
IIIT Allahabad workshop; Crypto-SPM positioned as new category.

JUN, 2026
White paper "Beyond Algorithms" launched with DSCI & Govt of Telangana; patent #2 filed; Free public TLS assessment launched.

AUG, 2026
TLS assessment adopted by multiple reputed organizations; NQM Cohort 3 selected

CURRENT STATUS
Expanded engineering team (8 Full-Time), cryptography-focused talent and senior consultants; market positioning and next-generation roadmap underway



Siddharth Lakhani
Founder, CEO & Board Director



Virendra Pal Singh Kalsi
Board Director



Bandana Mishra
Board Director



Bharat Panchal
Board Advisor



Naval Shevade
Board Advisor



TAQBIT LABS PVT

Scalable quantum computing powered by
precisely controlled neutral atom arrays



CONNECT WITH US

QKD



QRNG

INNOVATION OVERVIEW

PROBLEM: Neutral-atom quantum computing can address the growing difficulty of solving large optimization, chemistry and materials problems with classical methods. Today, many quantum systems are limited by qubit scalability, connectivity, noise, control complexity and high infrastructure costs, which slows practical deployment and real-world experimentation.

SOLUTION: We are developing a neutral-atom quantum computing platform that traps individual atoms in reconfigurable optical-tweezer arrays and controls them with precision lasers. The architecture combines long coherence, high connectivity and scalable qubit layouts, enabling researchers and enterprises to test larger quantum circuits and pursue useful applications in chemistry, materials and optimization.

KEY BREAKTHROUGHS

Established laser cooling and trapping of neutral atoms in a magneto-optical trap, followed by Rydberg spectroscopy and reliable single-atom trapping. Generated programmable optical-tweezer arrays using a spatial light modulator (SLM) and characterized an acousto-optic deflector (AOD) for rapid beam steering. Integrated and characterized the microscope objective and imaging system for atom-resolved detection. Developed a computer-interface and control system to coordinate lasers, optics, data acquisition and experimental sequences. Created algorithms for atom rearrangement and defect-free array generation, providing the essential foundation for scalable neutral-atom quantum computing experiments.

SECTOR IMPACT



GOVERNMENT & Defence



BANKING & FINANCE



TELECOMMUNICATIONS
& POWER



SPACE & SATELLITE

MILESTONES & STATUS

2018
Company Inception
The company was officially founded

2020
Secured DRDO Tender
Secured first major DRDO contract

2022
Successful Delivery
Successfully delivered the initial systems to DRDO

2024
Repeat Order
Secured a major repeat order from DRDO for long-distance QKD systems

2025
QKD Systems Delivery
Successfully miniaturized and delivered the long-distance QKD systems to DRDO & Developed Giga-fast QRNG Engineered and launched an industrial grade Giga-fast Quantum Random Number Generator (QRNG)

2026
Successful Military Field Trials
Successfully completed rigorous military field trials in direct collaboration with DRDO, validating the technology for defence deployment.



Animesh Aryan
Founder - CEO
Quantum Physicist



Bilesh Prasad
Founder
Engineer + MBA/Deeptech



CONNECT WITH US

Q QUANFLUENCE

Quianfluence

Building a universal photonic quantum computer that will leapfrog existing machines

INNOVATION OVERVIEW

PROBLEM: Relevant for India's economy depending on cryogenic refrigeration to build a Quantum computer cannot be the answer. We designed our tech on Photonics hence Quianfluence's bet is that using light instead of electricity for computation could let future quantum systems eventually run at room temperature

SOLUTION: A flagship photonic full-stack platform, built as a complete stack from low-loss photonic hardware and control systems to cloud-accessible compute platforms

KEY BREAKTHROUGHS

The core innovation is the Optical/Coherent Ising Machine a quantum-inspired, time-multiplexed coherent Ising machine where an opto-electronic gain-dissipative loop evolves decision variables while interaction terms run in a high-speed electronic circuit, with amplitude stabilization and solution-diversification controls to avoid getting trapped in local minima

SECTOR IMPACT

QUANTUM COMMUNICATION

QKD networks, entanglement distribution, teleportation

CONTROL ELECTRONICS

Multi-modality universal controller, programmable instrumentation

QUANTUM COMPUTING

Computing platforms, transduction, quantum switch, load balancers

MILESTONES & STATUS

**2021
FOUNDED:**
After successful exits – Incubated at IIT Madras Research Park

**2021
IP and PATENT :**
Everything build IN INDIA – 9 Patents filed 1 granted

**2022 - 2026
PRODUCT :** with TRL Level 8 – Coherent Ising Machine – Hardware with 20k variables QRNG, SPD, BD and PIC

May 2027
First release of the Quantum Computer with 4 qubits

MID 2029:
Full stack Photonic Quantum Computer

CURRENT STATUS
Full stack platform with a dedicated Hardware stack



Sujoy Founder and CEO



Biman Co-Founder and CTO



Ravi Co-Founder and COO



Aditi Co-Founder and CPO



FORTYTWO

SECURE TODAY. FUTURE READY.

Quantum-Safe Digital Trust



CONNECT WITH US

INNOVATION OVERVIEW

PROBLEM: Enterprises run millions of distributed identities across humans, apps, APIs and devices, yet security stacks stay fragmented – and quantum computers will soon break the RSA/ECC encryption they rely on.

SOLUTION: Fortytwo Labs built π -Control, giving every human, app, API and device one CryptolD that strengthens with use replacing fragmented tools with a single quantum-safe trust fabric at population scale.

KEY BREAKTHROUGHS

CryptolD is a self-evolving cryptographic identity that strengthens with use instead of decaying like a certificate – patented in India and the US. Ci ϕ authentication and Ci 2 key exchange remove certificates and shared secrets, resisting Shor's and Grover's algorithms. Proven at population scale: 33M+ identities, 100M+ daily transactions, 5,000+ TPS across 700+ apps in 7+ countries, zero customer churn.

SECTOR IMPACT

BFSI



DEFENCE



GOVT & DPI



ENTERPRISE

33M+ identities secured
at ICICI Bank, 5,000+ TPS

AUTH42 protects classified
Indian Army STEAG data

Post-quantum research
with India's NCSC

Secures enterprises apps

MILESTONES & STATUS

2016:
Founded by
Sanjay
Deshpande
& Nilesh
Dhande

2023:
Won SIDM
Defence
Champion
Award,
NASSCOM
Emerge 50

2024:
First two
patents:
digital
identity & key
agreement

2025:
Deployed
AUTH42 for
STEAG;
granted 3rd
patent

2026:
Defended Ci 2
post-
quantum
system at C-
SAFE forum

CURRENT STATUS
TRL 9, in production at ICICI
Bank, Yes Bank & Indian
defence (STEAG)



Nilesh Dhande
Cofounder & CEO



**Sanjay
Deshpande**
Chief Scientist



Swaminathan Iyer
Head Govt &
Defence



Neeraj Gupta
Head Engineering



CONNECT WITH US



QINSIGHT LABS

Architecting the Future of
Frictionless Intelligence.

INNOVATION OVERVIEW

PROBLEM: India needs an indigenous, scalable quantum stack spanning quantum software, large-scale simulation, modular hardware, physical QPUs and distributed quantum infrastructure.

SOLUTION: QInsight Labs is building an integrated quantum stack:
QForge™ → QForge™ Infinity → QFPGA → dQPU → multi-node QPU infrastructure.

KEY BREAKTHROUGHS

QInsight Labs is building an indigenous **end-to-end quantum computing technology stack**. QForge™ enables visual quantum circuit design, simulation and experimentation. QForge™ Infinity extends this capability to extremely large structured quantum systems. QFPGA advances the stack toward modular quantum-computing hardware. dQPU introduces NV-diamond-based physical quantum processing nodes. These individual nodes provide the foundation for a scalable **multi-node QPU infrastructure**. The key breakthrough is the progressive integration of **quantum software, large-scale simulation, modular hardware, physical quantum processing and distributed infrastructure** within one technology roadmap—creating a pathway from accessible quantum development to scalable indigenous quantum computing systems.

SECTOR IMPACT

EDUCATION

Makes advanced quantum engineering practically accessible.

QUANTUM R&D

Enables end-to-end indigenous quantum experimentation

TELECOMMUNICATION

Enables distributed quantum communication infrastructure research

DEFENSE & SECURITY

Strengthens sovereign quantum computing technology capabilities.

SCIENTIFIC COMPUTE

Provides scalable quantum experimentation infrastructure.

AI & OPTIMIZATION

Enables exploration of large optimization problems

SEMICONDUCTOR

Advances modular indigenous quantum hardware development

MILESTONES & STATUS

4.

APR, 2026
QForge™
Quantum development platform operational

APR, 2026
QForge™ Infinity
Large-scale quantum engine demonstrated

DEC, 2026
QFPGA
Modular quantum architecture under development

DEC, 2027
dQPU
NV-diamond node QPU under development

DEC, 2028
Multi-Node QPU
Scalable infrastructure architecture under development



Prof. Manav Bhatnagar
Founder & Director



Prof. Arti M.K.
Founder & Director



Mr. Saurabh Joshi
Director



Ms. Nikita Kumari
Quantum Hardware & Engineering Lead

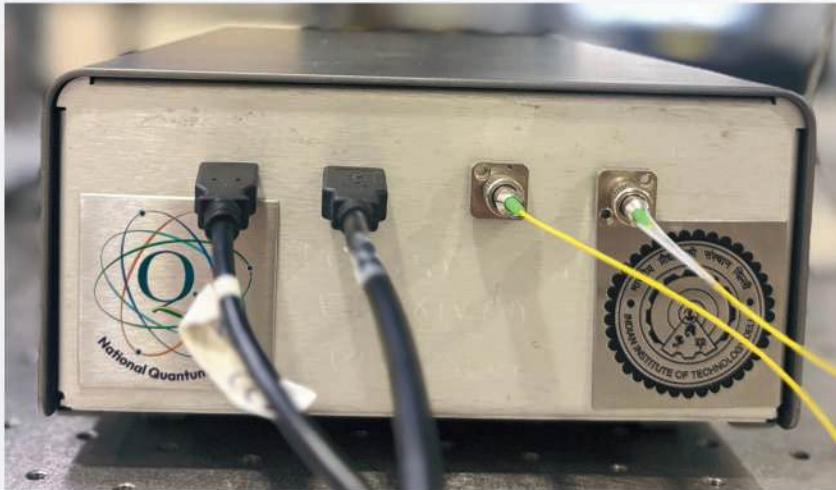


TAHQEECAT

Towards Trusted-node-free Hybrid Quantum
Secure Communication Networks



CONNECT WITH US



Telecom Entangled Photon Pair Source

INNOVATION OVERVIEW

PROBLEM: Conventional cryptographic systems are vulnerable to emerging quantum computing attacks, threatening future data security and communication networks. This will affect governments, banks, critical infrastructure and everyday users

SOLUTION: Entanglement based QKD enabled by Fiber-integrated, telecom-band entangled photon sources paired with live QKD protocols (BBM92) over hybrid fiber and free-space links. For security, the communication needs to be trusted node free.

KEY BREAKTHROUGHS

- A CHSH Bell parameter of 2.78 ± 0.03 confirms genuine polarization entanglement from our fiber-integrated, telecom-band (1550/1560 nm) photon-pair source packaged at TRL6 with >90% fidelity and $>10^5$ pairs/sec.
- An interactive simulation suite covering BB84, BBM92, E91, Decoy-QKD, DPS-QKD and multihop QKD lets partners model QBER and secure key rate before deploying hardware
- Entanglement based fiber QKD has been demonstrated with coexistence of classical signal on the same fiber
- Setting up of a working free space QKD link, a step towards heterogeneous free-space-fiber approach.

SECTOR IMPACT

TRUSTED NODE FREE QKD

Quantum Key Distribution, Entangled photon sources, Data security for telecom, finances, data transfer, digital services

QUANTUM NETWORK TESTBED

Repeater free Entanglement based quantum network links, Multi node quantum Network, Testing of QKD and network solutions

INTERCITY QUANTUM NETWORK

Scaling entanglement Testbed to larger distances. Regional quantum secure networks, secure intercity communication

TOWARDS QUANTUM INTERNET

Quantum network of regional scale quantum networks for ultra secure communication and secure distributed quantum computing and distributed quantum sensing

MILESTONES & STATUS

SEPT, 2025
Realization and Patent filling of the Polarization entangled photon source

DEC 2025
TRL 5 source: >90% fidelity, CHSH Bell parameter > 2.70

MAR, 2026
Live Qkd and network simulator: BBM92, E91, Multihop

JUN, 2026
Entanglement-based fibre QKD tested for 100km fibre and coexistence with classical signal on same fiber

SEPT, 2026
Entanglement based QKD and Delhi-Sonepat-Roorkee network under construction

CURRENT STATUS
TRL6 entanglement source validated; QKD network Simulator developed, QKD link testbed across campus under testing and development.



Dr. Bhaskar Kanseri
Professor, lead PI



CONNECT WITH US



QuILA (Quantum Internet with Local Access)

India's First Inter-City Hybrid QKD-PQC Quantum Secure Network

INNOVATION OVERVIEW

PROBLEM: Securing long-distance telecom infrastructure against quantum computing threats requires costly dedicated optical lines and complex co-existence techniques.

SOLUTION: QuILA deploys hybrid QKD (Quantum Key Distribution) and PQC (Post-Quantum Cryptography) over existing commercial BSNL fibre, co-propagating quantum and classical signals over the same core.

KEY BREAKTHROUGHS

QuILA achieved India's first long-distance quantum-secure inter-city network, connecting Chennai and Bengaluru across a 600 km physical backbone with 17 nodes over commercial BSNL fibre. The project demonstrated a breakthrough in single-fibre co-propagation by carrying quantum and classical signals over the same core, overcoming optical loss equivalent to a 1,460 km QKD link. By integrating hybrid QKD and Post-Quantum Cryptography (PQC), QuILA seamlessly bridges metro access networks (MAQAN) with inter-city backbones between IIT Madras Research Park and C-DAC Bengaluru. India's First Long-Distance Inter-City Quantum Backbone: Connects Chennai and Bengaluru across a 600 km commercial BSNL optical fibre link, interconnecting 17 secure nodes anchored at IIT Madras Research Park and C-DAC Bengaluru

SECTOR IMPACT

BFSI (BANKING & FINANCIAL SERVICES)

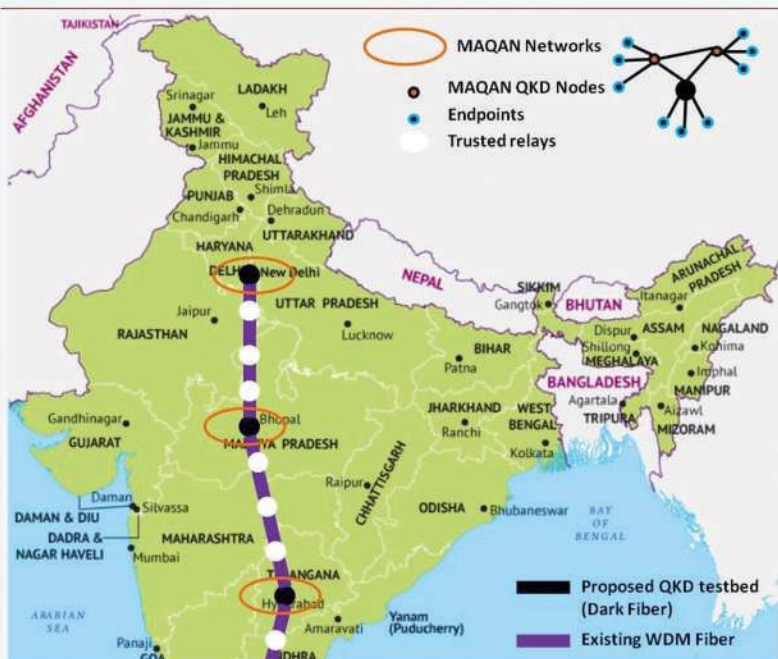
Secures high-value inter-bank settlements and financial data transfers between Chennai and Bengaluru against future quantum decryption threats ("harvest now, decrypt later").

DEFENCE & STRATEGIC NETWORKS

Provides unhackable, physically secure communication channels for military command nodes, defense labs, and strategic inter-city data transmission.

GOVT & DPI (DIGITAL PUBLIC INFRASTRUCTURE)

Protects national databases, government cloud backbones, and National Quantum Mission (NQM) testbeds using hybrid QKD + PQC multi-domain routing



MILESTONES & STATUS

2019-2020 MAQAN LAUNCH: Initiative launched by MeitY to build metro-area quantum network capabilities.

2021-2023 METRO DEPLOYMENT: Established Chennai's 5-node MAQAN quantum access network.

2024-2025 QuILA INITIATIVE: DST/NQM funds inter-city link expansion connecting Chennai and Bengaluru.

2026 LIVE TESTBED: Operational 17-node hybrid QKD-PQC inter-city link over 600 km BSNL infrastructure.



Anil Prabhakar
Project Director
Professor, IITM



Vaibhav pratap Singh
scientist 'E'
CDAC
Bangalore



Ashutosh Singh
Phd
scholar, IITM



Vijay Rajendran
Project
Manager,
QuILA



Rahul Awasthi
Project
Associate
QuILA



CONNECT WITH US



QUANTUM AI GLOBAL

Towards Trusted-node-free Hybrid Quantum
Secure Communication Networks

INNOVATION OVERVIEW

PROBLEM: Conventional cryptographic systems are vulnerable to emerging quantum computing attacks, threatening future data security and communication networks. This will affect governments, banks, critical infrastructure and everyday users. Organizations can't bridge classical AI limitations or deploy complex quantum workflows due to hardware bottlenecks, severe security risks from upcoming quantum threats, & lack of accessible, enterprise-ready hybrid integration system.

SOLUTION: At the intersection of quantum technology & AI, we design & deliver scalable products, solutions, & infrastructure enabling organizations to adopt & leverage quantum capabilities into practical, deployable systems.

KEY BREAKTHROUGHS

Quantum AI Global has achieved critical deep-tech breakthroughs by engineering room-temperature quantum memory, EPS-QKD systems, ultra-precise quantum biosensors, narrow linewidth external cavity diode lasers and QSleeve post-quantum security to eliminate expensive cryogenic costs, secure networks and completely decouple advanced enterprise workflows and research labs from volatile foreign deep-tech supply chains. Furthermore, their high-performance Q-Cluster and QNTsim simulation platforms, alongside localized academic hardware kits on Quantum Memory, EPS-QKD and Quantum Sensors aligns well with the NQM AICTE goal of achieving reach of Quantum knowledge to the colleges and universities across India.

SECTOR IMPACT



Quantum Memory:
Research Higher
Education & Advanced



ECDL:
Narrow linewidth Deep tech
laser for Quantum Technology



Quantum Sensing:
Ultra-precise magnetic field
measure utilizing R.T. Alkali



EP S-QKD:
Entangled photon source based
Quantum Communication setup

MILESTONES & STATUS

FOUNDED:
November 2019,
Incubated at IIT
H, 75 employees
PhD, MTech
from leading
institutions

**INTELLECTUAL
PROPERTIES:**
MORE THAN 141
PS
filed, 3 of them
Granted

**Product
Portfolio:**
Quantum
Communication,
Quantum
Sensing,
Quantum
Cryptography

**Key
Innovations:**
First made in
India Quantum
Memory, First
Commercial
external Cavity
Diode Laser

Partnered With:
IIT Hyderabad,
TIFR Hyderabad,
IISc Bangalore,
IIT Chennai,
DRDO, ISRO,
NPCI, CDAC,
PwC

CURRENT STATUS
Working on
Advanced
Miniaturized
Quantum
Biosensor



Sanjay Chittore
Founder CEO



Col. Kapil Jaiswal
CTO, Ex IISc,



**Dr. Sachin
Barthwal**
Head Quantum
Technology



**Dr. Monika
Thakran**
Quantum
Sensing Lead



CONNECT WITH US



PIPETA TG Post-Quantum IP Encryptor and PQ-TLS Accelerator

Quantum-Safe Communication

INNOVATION OVERVIEW

PROBLEM: Safeguard critical national, strategic, and BFSI enterprise networks against the emerging threat of quantum-enabled cryptanalysis by hostile nation-states by addressing both Harvest Now, Decrypt Later (HNDL) risks to long-lived sensitive data and Trust Now, Forge Later (TNFL) risks arising from the future compromise of cryptographic trust and authentication mechanisms.

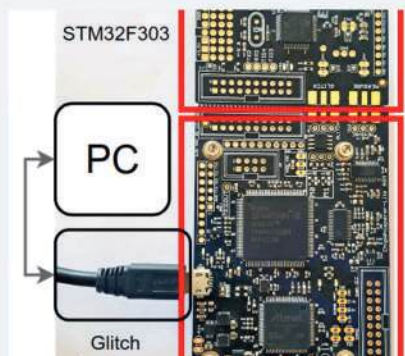
SOLUTION: Develop and deploy quantum-safe Layer-3 (IP) network encryptors and PQ-TLS ASIC-based PCIe accelerator cards incorporating SCA and FIA resistant RTL implementations of the NIST post-quantum cryptographic standards FIPS 203 (ML-KEM), FIPS 204 (ML-DSA), and FIPS 205 (SLH-DSA).

KEY BREAKTHROUGHS

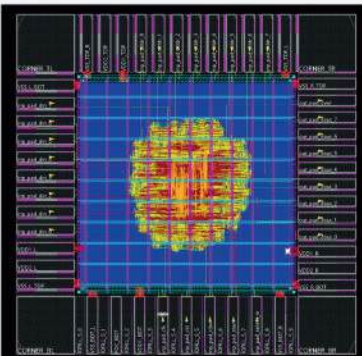
- 10 Gbps Quantum-Safe IP Encryptor: PoC demonstration of a 10 Gbps quantum-safe, in-line Layer-3 IP network encryptor supporting ML-KEM-1024, AES-256-GCM, and an integrated True Random Number Generator (TRNG).
- FPGA-Based PQC Implementation: HDL implementation of FIPS 203 (ML-KEM) and FIPS 204 (ML-DSA) targeting FPGA-based high-speed networking equipment.
- Side-Channel Analysis (SCA) Facility: Establishment of a state-of-the-art SCA facility at IIT Kanpur and comprehensive side-channel leakage analysis of post-quantum cryptographic IP cores.
- Fault-Injection Analysis (FIA) Facility: Establishment of a state-of-the-art FIA facility at IIT Bhilai and systematic fault-injection analysis of post-quantum cryptographic IP cores.
- PQ-TLS ASIC: Development of a unified ASIC-based hardware implementation of FIPS 203 (ML-KEM) and FIPS 204 (ML-DSA) for high-performance Post-Quantum TLS (PQ-TLS) acceleration. (IIT Kharagpur)

10Gbps PQ IP Encryptor PoC

Side Channel Analysis Lab



Fault Injection Analysis Lab



PQ-TLS ASIC Layout —
TSMC 28nm, Cadence

SECTOR IMPACT



Defense and Para-Military
Quantum Secure and
Trustworthy Communication
in battlefield



Industrial Sector
Secure data transfer
and trade secret
security in Industry



FinTech (BFSI)
Secure transfer of
money and mitigation
of digital attacks



Atomic Energy Installations
Safeguarding nuclear energy
installations from hostile
actions

MILESTONES & STATUS

SEP 2024 – JUN, 2025
Inception: 2024
Quantum Threat
Analysis and
Project Proposal
Submission to
DST for
consideration

DEC, 2025
Research: 2025
Analysis of different
PQC algorithms for
mitigating quantum
threat. PQC SCA
and FIA schemes
study and literature
review

DEC, 2025
Development: 2025
System architecture
design of 10Gbps IP
Encryptor. PQ-TLS
ASIC unified PQ
hardware design
and testing on
FPGA target

JUN, 2026
Phase-I Deliverable:
2026
PoC Demo of 10 Gbps
IP encryptors;
establishment of
SCA/FIA security labs;
and PQ-TLS ASIC
design using TSMC PDK

JUL, 2026
PHASE-II: 2026
Initiated hardware
PCB design of 10
Gbps IP Encryptor
based on FIPS 140-
3 standard.
SCA/FIA counter-
measures design

**CURRENT
STATUS**
TRL-4
PoC Demo of
10 Gbps PQC
IP Network
Encryptor



Prashant
Chugh



Deepak
Gaur



Dr. Debapriya
Basu Roy



Dr. Dhiman
Saha



Dr. Debdeep
Mukhopadhyay



Dr. Sarani
Bhattacharya



CONNECT WITH US

Q→NU

QNu Labs

Global Trust Provider in the
Quantum and AI era

INNOVATION OVERVIEW

PROBLEM: A sufficiently capable quantum computer will break today's RSA and elliptic-curve encryption, and harvest-now-decrypt-later attacks already target data with a long shelf life: traffic captured now can be stored and decrypted later. Relying on foreign cryptography also leaves India dependent on algorithms and hardware it does not own.

SOLUTION: QNu Labs builds a fully indigenous, end-to-end hybrid quantum-safe stack at TRL 9: Armos (QKD), Tropos (QRNG) and the PQC Solutions line for post-quantum cryptography. QNu also offers QShield Platform, carrying the National Cryptographic Assessment & Assurance Framework: Discover, Assess, Assure. DST selected QNu to build what it calls the world's first end-to-end quantum-safe heterogeneous network.

KEY BREAKTHROUGHS

1,000 km quantum-safe network: India's longest, demonstrated April 2026 under the National Quantum Mission on QNu technology. Six nodes, five spans, QBER under 5% on every hop.

Full sovereign stack at TRL 9: QKD, QRNG and PQC Solutions, indigenous end to end, validated in government and defence field trials.

QShield 2.0: the National Cryptographic Assessment & Assurance Framework. Discover · Assess · Assure. Crypto discovery and CBOM, sovereign key management, secure browsing, application identity.

Certified, not only claimed: NIST-selected ML-KEM and ML-DSA in PQC Solutions, NIST Entropy Source Validation for Tropos, TEC Type Approval for Armos.

SECTOR IMPACT

BFSI & PAYMENTS

quantum-safe key management and hardware entropy for banks, payments and market infrastructure, aligned to SEBI's CSCRF and the RBI's Q-SAFE programme.

DEFENCE & STRATEGIC COMMUNICATIONS

QKD on service fibre, quantum-safe Wi-Fi running at training establishments, and QORE securing UAV command links

TELECOM & NETWORK BACKBONE

quantum-safe backhaul and inter-data-centre links for 5G and O-RAN; Qosmos delivers entropy as a service through an API where on-premise QRNG is not feasible.

GOVERNMENT, PSU & CRITICAL INFRASTRUCTURE

crypto-agility and CBOM readiness for critical networks and data centres via QShield; QRNG SIP in orbit aboard a Dhruva Space satellite since August 2025.

MILESTONES & STATUS

2016
Founded in Bengaluru; incubated at IIT Madras Research Park

2023-24
Indian Navy order for 25 QKD systems; TEC Type Approval for Armos.

2024-25 :
Among the first eight NQM startups; ₹60 Cr Series A; 500 km quantum-secure link.

2026:
1,000 km network demonstrated; QKMS launched; quantum sensing added.

2026:
PM Modi and President Macron visited the QNu booth at Bharat Innovate

CURRENT STATUS
Quantum-security products are field-validated, with key technologies certified, under development, and undergoing validation.



Srinivasa Rao Aluri,
Co-Founder & Chairman



Sunil Gupta, Co-Founder & Chief Executive Officer



Samir Kulshrestha,
Chief Financial Officer



Dilip Singh, Chief Technology Officer



CONNECT WITH US



DRDO

बलस्य मूलं विज्ञानम्

INNOVATION OVERVIEW

PROBLEM: With the commercialization of Quantum Computers, present cryptographic infrastructure, based on conditional security, faces an existential threat due to lack of ability to generate perfectly unpredictable cryptographic keys and distributing same securely over unsecure/untrusted network.

SOLUTION: Use of QRNG and QKD shifts the focus of security from realm of math to laws of Quantum physics such that prediction of keys and interception of same over unsecure network becomes impossible.

KEY BREAKTHROUGHS

1. DRDO has developed QRNGs based on Branch Path Logic(250Kbps), Time of Arrival(160Mbps), Quantum Phase Noise(122Mbps, can go in Gbps range), Vacuum Fluctuation (3Mbps, can go in Gbps range). Completed ToT of BPL based in 2022 and ToT for remaining is in process.
2. Successfully developed COW and DPS QKD and demonstrated secure key distribution in a field trial over armed force network. Proof of Concept (PoC) competed for extending P2P range of QKD to thousands of kilometers using trusted relay configuration.
3. Demonstrated superconducting circuit based 6-qubit Quantum Computer; developed FPGA based low cost Calibration, Control and Measurement unit for Quantum Computer. ToT provided to Industry.
4. Atomic Magnetometer with PicoTesla level sensitivity developed and demonstrated in field. ToT initiated.



BPL Based QRNG



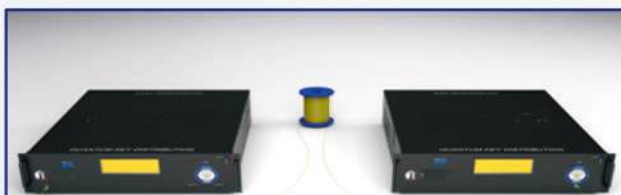
ToA Based QRNG



QPN Based QRNG



VF Based QRNG



Key exchange using DPS-QKD and COW-QKD between Alice and Bob separated by 100 km fiber with SKR $\geq$ 1 Kbps and QBER $<$ 5%



FPGA based Calibration, Control and Measurement unit for Quantum Computer



Field Tested Atomic Magnetometer

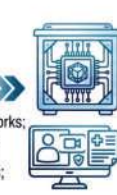
SECTOR IMPACT



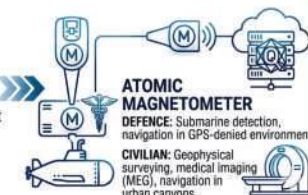
QRNG
DEFENCE: Unpredictable cryptographic keys for comms; immunity to attack.
CIVILIAN: Secure banking, e-commerce, and high-integrity data.



QUANTUM COMMUNICATION
DEFENCE: Absolute-secure networks; unhackable signal transmission.
CIVILIAN: Secure financial data transfers; ultra-private data links; smart grid.



QUANTUM COMPUTING
DEFENCE: Optimization of logistics, route planning, threat modeling.
CIVILIAN: Accelerated drug discovery, material science simulation, financial modeling.



ATOMIC MAGNETOMETER
DEFENCE: Submarine detection, navigation in GPS-denied environments.
CIVILIAN: Geophysical surveying, medical imaging (MEG), navigation in urban canyons.

MILESTONES & STATUS

Developed BPL QRNG in Dec 2020

POC TRIAL: Completed PoC trial for table top QKD in Feb 2022 for ~100 km BPL QRNG ToT completed in April 2022

PROTOTYPE: Completed development of QKD prototypes (TRL>7) in Aug 2025 Independent evaluation of all 4 QRNGs by Dec 2025 ToT for Quantum Processor Control Unit (QPCU)

Field Trial: Completed several field trials of QKD prototypes over armed force network in 2025 and 2026 Magnetometer performance demo in over and under water scenario

TRUSTED RELAY NODE: Demonstrated PoC for trusted relay node to VCOAS in Sep 2026 to overcome range limitation of QKD

CURRENT STATUS Field trial for trusted relay is in process. Development of Long range QKD that breaks repeaterless bound initiated ToT of QRNGs is in process ToT of Magnetometer initiated



T Jimmy B,
Sc F



Rajeev
Yadav, Sc F



Bharat Singh,
Sc B

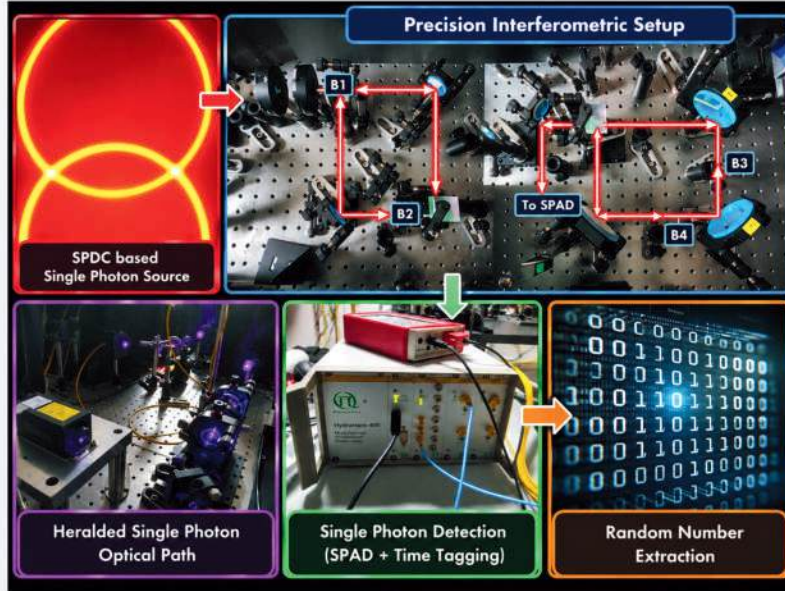


CONNECT WITH US



QuSyn Tech

Quantum for All, Together
for Quantum



INNOVATION OVERVIEW

PROBLEM: Modern cryptographic systems depend on truly unpredictable randomness, yet conventional RNGs and most QRNGs lack live certification of randomness, leaving a critical vulnerability in secure infrastructure.

SOLUTION: Q-RaNGe introduces the world's first live-certified quantum randomness platform, continuously validating unpredictability through fundamental quantum correlations as randomness is generated. It transforms quantum randomness from assumed trust to continuously proven unpredictability.

KEY BREAKTHROUGHS

Q-RaNGe represents a breakthrough in quantum randomness by combining a real heralded single-photon source with loophole-free, semi device independent certification based on fundamental quantum correlations. Rather than trusting a device model or relying solely on statistical tests of the generated bits, the system uses LGI violation and NSIT validation to continuously certify unpredictability from the observed physics itself. This enables live, self-verifying quantum randomness, resilient to device imperfections, drift, and partially untrusted components—shifting the paradigm from “trust the device” to “verify the quantum process.”

SECTOR IMPACT

CRITICAL INFRASTRUCTURE

- BFSI
- Defence
- Telecom
- Cloud
- Government
- Secure Communications
- Critical Networks
- National Security
- Data Centres
- HSM/KMS

SECURITY & COMPLIANCE

- Live Certification
- Auditability
- Resilience
- Continuous Verification
- Tamper Detection
- Silent-Failure Detection
- Entropy Assurance
- Regulatory Readiness

SOCIO-ECONOMIC

- Digital Trust
- Privacy Protection
- Indigenous Quantum Technology
- Technology Sovereignty
- Skilled Employment
- Quantum Ecosystem
- Secure Digital Economy



Prof. Urbasi Sinha
Co-Founder



Prof. Aninda Sinha
Co-Founder



Siddhartha Nair
Finance & BD



Ashwini Bhat
Operations



Dr. Kallol Sen
Co-Founder & Director



Dr. Debadrita Ghosh
Director



Dr. Saumya Ranjan Behera
Consultant

MILESTONES & STATUS

2022
Scientific Foundation
Loophole-Free LGI with Heralded Single Photons
PRX QUANTUM 3, 010307 (2022)

2022
Patent Filed
Certified Randomness Technology
Indian Patent No: 594506

2024
Proof of Concept
Certified quantum randomness experimentally demonstrated
PHYSICAL REVIEW LETTERS 133, 020802 (2024)

2025
Platform Expansion
Demonstrated on IBM quantum hardware
Front. Quantum Sci. Technol. 4:1661544 (2025)

CURRENT STATUS
Product Translation Infrastructure TRL 7
Hardware >TRL 5
IISc Incubated
NQM Start-Up grant Cohort III



CONNECT WITH US



C-DOT

(Centre for Development of Telematics)

Telecom Technology Centre of
Govt. of India



Alice (Transmitter)



Bob (Receiver)

INNOVATION OVERVIEW

PROBLEM: Classical encryption relies on computational hardness that future quantum computers can break. Adversaries can harvest encrypted data today and decrypt it later. Traditional key exchange also cannot reliably detect eavesdropping

SOLUTION: QKD uses the laws of quantum mechanics to distribute encryption keys, guaranteeing information-theoretic security. Any interception attempt disturbs the quantum states, ensuring real-time eavesdropping detection.

KEY BREAKTHROUGHS

- Completely indigenous, industry-grade, field proven **Quantum Key Distribution (QKD)** solution using Differential Phase Shift (DPS) protocol
- Indigenous sub-modules (Single-Photon Detector (SPD) and RF driver)
- Multiple deployment topologies (linear, star, ring, etc.)
- Supports failsafe QKD and hybrid QKD-PQC key generation
- First in India to secure Technology Approval (TEC GR 91000:2022)
- Multiple field trials and commercial deployments
- Transfer of technology to 4 Indian manufacturers
- 1U compact size
- ETSI GS QKD 014 compliant key supply interface
- Can reuse existing telecom fibre infrastructure

SECTOR IMPACT



Banking and Financial Services



Government and
Defense Networks



Data Centre
Interconnects



Telecom
Networks

MILESTONES & STATUS

FEB 2022
First commercial
deployment

FEB, 2023
Live QKD link
operational
between
Sanchar
Bhawan & NIC,
Delhi

AUG, 2023
Technology
Approval from
TEC for COW &
DPS QKD
system (TEC GR
91000:2022)

SEP, 2023
Transfer of
technology
agreements
signed with 4
Indian
manufacturers

JUL, 2026
Certificate of
Approval from
TEC for next-
gen MDI QKD
solution

CURRENT STATUS
Industry-grade, field worthy
QKD solutions and sub-
modules (SPDs and RF
drivers) at TRL 9

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New Delhi 110030

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C-DOT

(Centre for Development of Telematics)

Shielding the Nation with Quantum Technology



Q-SETU
Q-सेतु

INNOVATION OVERVIEW

PROBLEM: Critical national and enterprise networks are increasingly vulnerable to quantum-enabled cryptanalysis, while remaining exposed to existing classical cyber threats.

SOLUTION: Q-SETU as a compact, in-line, application-agnostic, quantum-safe Layer3 encryptor supporting NIST post-quantum standards, can secure diverse network environments from quantum threat, without major changes to existing infrastructure.

KEY BREAKTHROUGHS

- Support for Quantum-safe key exchange (ML-KEM/FIPS-203) and digital signatures (ML-DSA) algorithms implemented at IP layer
- Hybrid key exchange combining classical and quantum-safe algorithms for higher security and resilience
- Direct integration with any QKD system for key loading
- Level 2 physical security using opaque packaging, tamper-evident seals
- 2-factor authentication for secure system access
- Compact form factor (8.66" x 6.12" x 1.72"), <14W power consumption and no forced-air cooling required
- Device level redundancy also supported

SECTOR IMPACT



Defense & Para-military
Quantum Secure and Trustworthy Communication in battlefield



Banking & Financial Services
Quantum Secure financial data and trade secret transfer in Industry



Govt. & Telecom Networks
Secure government and critical communications from Quantum-based digital attacks



Healthcare
Safeguarding critical patient health records from Quantum-based HNDL attacks

MILESTONES & STATUS

2023 Inception
Market Requirement Analysis and product architecture conceptualization & analysis of different PQC algorithm

2024 Research & Development
System Design finalization, Hardware design and PQC software implementation, prototype release of the product

2025 Enhancements
Hardware and software enhancements as per the design feedback and NIST PQC standards

2026 Network Trials
Successful captive network trials completed in point-to-point and point-to-multi point topologies

CURRENT STATUS 2026
TRL-8: ready for POC field trials and subsequent deployment

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Shielding the Nation with
Quantum Technology

Q-VIKRAM (CPQE) Q-विक्रम



INNOVATION OVERVIEW

PROBLEM: Protect critical national strategic and BFSI enterprise networks from quantum cryptanalysis by hostile nation-states, mitigating both the long-term compromise of in-transit data (Harvest Now, Decrypt Later / HNDL) and IT system takeover through forged cryptographic trust (Trust Now, Forge Later / TNFL)

SOLUTION: Deploy quantum-safe network encryptors implementing NIST post-quantum standards: FIPS 203 (ML-KEM) to neutralize HNDL attacks, alongside FIPS 204 (ML-DSA) and FIPS 205 (SLH-DSA) to prevent TNFL-based cryptographic trust compromise

KEY BREAKTHROUGHS

- Hardware Description Language (HDL) implementation of FIPS 203 (ML-KEM) and FIPS 204 (ML-DSA) targeting FPGA-based network equipment.
- Design of a quantum-safe, in-line IP network encryptor equipment supporting **ML-KEM-1024**, **AES-256-GCM**, and an integrated **TRNG**. (**Q-VIKRAM** a.k.a. **CPQE**)
- Physical tamper-proof **Q-VIKRAM** system architecture with Side-Channel Attack (SCA) resistant cryptographic HDL cores.
- 1 Gbps line-rate encryption throughput in **IPsec point-to-multipoint topology**, integrated with Multi-Factor Operator Authentication (MFA).

SECTOR IMPACT



Defense and Para-Military
Quantum Secure and Trustworthy
Communication in battlefield



Financial Sector
Secure financial data and
trade secret transfer in
Industry



Banking
Secure transfer of
money and mitigation of
digital attacks



Nuclear Energy Installations
Safeguarding nuclear energy
installations from hostile
actions

MILESTONES & STATUS

INCEPTION: 2022
Market
Requirement
Analysis and
product
architecture
conceptualization

RESEARCH: 2023
System Design
finalization and
analysis of different
PQC algorithms for
implementation

DEVELOPMENT: 2024
Hardware PCB and
PQC algorithm
FPGA(HDL)
firmware design and
implementation.
System Prototype
release

ENHANCEMENTS : 2025
System firmware
enhanced as per
NIST PQC
standards,. Added
SCA
countermeasures in
PQC algo firmware

NETWORK TRIALS: 2026
Successful
captive network
trials in point-to-
multipoint
network
topology.
Product Release

CURRENT STATUS
TRL-7
**OFFERED TO ARMY
FOR TRIALS**

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C-DOT

(Centre for Development of Telematics)

Shielding the Nation with Quantum Technology



Q-MAHASETU
Q-महासेतु
(NG-CEM)

INNOVATION OVERVIEW

PROBLEM: High-throughput commercial and critical network infrastructures are vulnerable to quantum cryptanalysis, while existing solutions fail to meet demanding L2/L3 encryption performance requirements at carrier-grade line rates.

SOLUTION: Q-MAHASETU as a commercial-grade, high-throughput quantum-safe network encryptor with a dedicated encryption engine supporting higher line rate encryption, suitable for deployment in higher throughput requirements such as data centres and core networks.

KEY BREAKTHROUGHS

- Dedicated Layer-2 & Layer-3 hardware encryption engine supporting Post-Quantum Cryptography key exchange (FIPS203, ML-KEM) and signature algorithms (FIPS204, ML-DSA).
- Hybrid cryptographic architecture combining classical and PQC algorithms, with an option to combine with QKD keys also.
- FIPS 140-3 Physical Security Level 3 with tamper detection, automatic zeroization, and protection against probing through ventilation paths.
- High-density I/O: 4x10G optical + 16x1G electrical ports with dedicated RED-BLACK separation
- 2-Factor authentication for secure system access and configurations

SECTOR IMPACT



Defense & Para-military
Quantum Secure and Trustworthy Communication in battlefield



Banking & Financial Services
Quantum Secure financial data and trade secret transfer in Industry



Govt. & Telecom Networks
Secure government and critical communications from Quantum-based digital attacks



Healthcare
Safeguarding critical patient health records from Quantum-based HNDL attacks

MILESTONES & STATUS

2024 Inception
Market Requirement Analysis and product architecture conceptualization

2024 Research & H/w Development
System Design finalization, Hardware design and PQC software implementation, prototype release of the product

2025 Software Development
Software Development and enhancements to come out with a prototype system

2026 Lab Trials
Successful captive lab trials completed in point-to-point and Hub-and-Spoke topologies

CURRENT STATUS 2026
TRL-6: ready for POC field trials

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QUANTUM COMPUTING

*ADVANCING COMPUTATION BEYOND THE LIMITS OF
CLASSICAL SYSTEMS*



QUANTUM TECHNOLOGY LANDSCAPE





Bloq Quantum

The platform to develop quantum algorithms 10X faster and easier.



CONNECT WITH US



One Workspace. Every SDK. Any Hardware.

Stop fighting with compatibility. Start building solutions.



INNOVATION OVERVIEW

PROBLEM: Translating complex quantum workflows into production-ready enterprise applications remains a massive bottleneck. Engineering teams struggle with complex dependencies, infrastructure overhead, and the specialized physics knowledge required, causing long delays in experimentation and testing.

SOLUTION: Bloq is a low-code, data-to-deployment software platform that reduces development time by 10x. Featuring an automated Experiments Module, a visual Circuit Studio, and a flexible Editor IDE, it bridges raw quantum hardware with enterprise IT architectures, eliminating infrastructure headaches.

KEY BREAKTHROUGHS

Delivers a 10x reduction in quantum research and development cycles by unifying data ingestion, visual circuit design, and GPU-accelerated code execution into a single workspace. Teams can upload real datasets directly to test models and evaluate performance metrics without building custom infrastructure from scratch.



One Workspace for the Entire Quantum R&D

Design, test, and refine hybrid quantum workflows in a single environment.



SECTOR IMPACT



FINANCE
Credit risk analysis, portfolio optimization, and derivative pricing.



ACADEMIA
Setting up Quantum Learning & Application Labs; rapid student upskilling.



AUTOMOTIVE
Supply chain routing and advanced fluid dynamics optimization.



Life Sciences / Chemistry
Synthetic data generation and molecular simulation.

MILESTONES & STATUS

MAY, 2024
Founded

JUN, 2024
Seed Fund :
+1.3 CR

FEB, 2026
Platform Launch
& Academic
Ventures

APR, 2026
Indian
Academy
expansion

AUG, 2026
International
Enterprise
Pilots

CURRENT STATUS
Revenue Stage / Early
Traction 1 Patent
filed



Sreekutan L S
CEO



Jay Patel
CTO



Nikhil Londhe
Researcher



Grishma prasad
Researcher



CONNECT WITH US



Qubitech

Indigenous cryogenic interconnect systems
for quantum, semiconductor and defence
platforms

INNOVATION OVERVIEW

PROBLEM: Quantum processors, cryogenic device characterisation and low-temperature sensing all depend on wiring that carries DC bias, control and readout signals from room temperature into a cryostat while adding almost no heat load to the cold stages. India has no established indigenous source for these harnesses. Research groups and system builders import them, facing long lead times, high cost, limited customisation and dependence on a small number of overseas vendors.

SOLUTION: Qubitech has indigenously developed a cryogenic DC wire harness engineered for stable operation from room temperature down to cryogenic stages. The design controls conductor material selection, component specification, thermal anchoring, connector integration and mechanical robustness to minimise heat leak while preserving signal integrity. The product has been fabricated, inspected and validated for electrical, mechanical and cryogenic performance, and is dispatch-ready – replacing imported assemblies with a locally manufactured, customisable alternative.

KEY BREAKTHROUGHS

Four quantified achievements. Cryogenic operation at 2.8 K full functional performance demonstrated in an operational dilution refrigerator, validating the harness under real cryogenic conditions. Thermal-cycling reliability electrical integrity maintained across 10 cryogenic thermal cycles, confirming resistance to repeated thermal stress. Vacuum-tight integration feedthrough leak rate of 10^{-8} mbar-L/s, with the harness validated at an operating vacuum of 10^{-3} mbar. Verified electrical integrity continuity confirmed across all designated channels after fabrication, assembly and thermal cycling. Together these establish a fully validated, dispatch-ready cryogenic DC harness indigenously designed, integrated and manufactured, matching established international product configurations.

SECTOR IMPACT

QUANTUM COMPUTING & SENSING

connects control, bias and readout electronics to cryogenic devices inside dilution refrigerators, supporting indigenous quantum hardware and reference facility development.

SEMICONDUCTORS & CRYGENIC ELECTRONICS

enables cryogenic characterisation of semiconductor devices, quantum materials and low-temperature electronics for a broad device-testing and research market.

DEFENCE & INFRARED SENSING

improves infrared detector sensitivity and enables low-noise, high-reliability sensing systems for surveillance, target detection and cryogenically-cooled defence sensors.

HEALTHCARE & SCIENTIFIC INSTRUMENTATION

supports superconducting magnets and cryogenic detectors used in MRI, NMR spectroscopy, medical imaging and biomedical research instrumentation.

MILESTONES & STATUS

2024
Qubitech Smart Solutions founded; indigenous quantum hardware development programme established

2025
Market research completed; cryogenic DC wire-harness identified as priority indigenous product

Q1 2026
Harness architecture, interfaces and function validated in laboratory (TRL 4)

MAY 2026
Materials and components specified, BOM finalised, procurement completed

JULY 2026
Prototype fabricated; electrical, mechanical and cryogenic performance experimentally verified (TRL 6)

Sep 2026
Harness validated at 2.8 K in dilution refrigerator; dispatch-ready (TRL 7)

Current status
Expanded engineering team (8 Full-Time), cry ptography-focused talent and senior consultants; market positioning and nextgeneration roadmap underway



Prudhvi Pinnaka Co-founder & CEO.



Naren Dhupati Co-founder & CFO.



Dr. Krishna Mohan Vattipalli Principal Scientist & Head

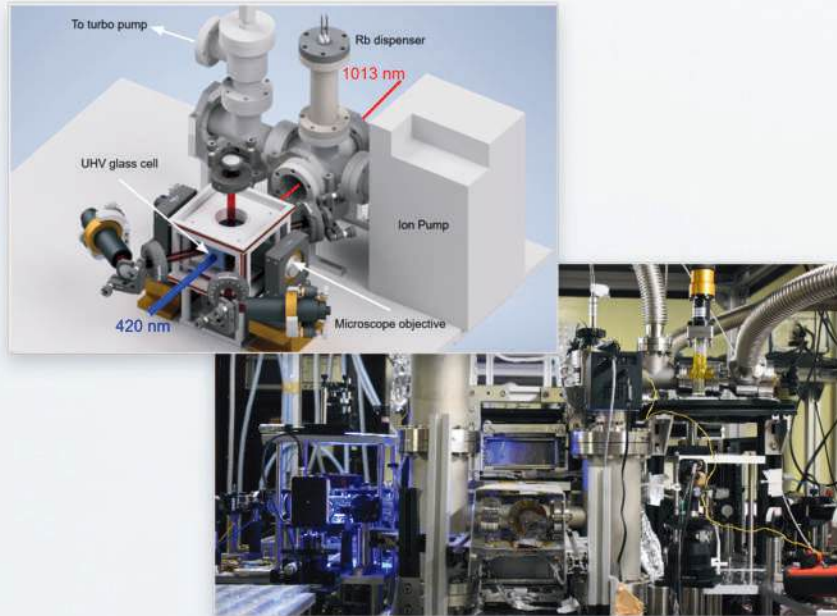


Dr. Tadi Siva Prasad Materials Scientist.



Neutral Atom Quantum Computing

Scalable quantum computing powered by
precisely controlled neutral atom arrays



INNOVATION OVERVIEW

PROBLEM: Classical methods struggle with large optimization, chemistry and materials problems. Many quantum systems are limited by qubit scalability, connectivity, noise, control complexity and high infrastructure costs, slowing practical deployment and real-world experimentation.

SOLUTION: A neutral-atom platform that traps individual atoms in reconfigurable optical-tweezer arrays and controls them with precision lasers combining long coherence, high connectivity and scalable qubit layouts so researchers and enterprises can test larger circuits in chemistry, materials and optimization.

KEY BREAKTHROUGHS

Established laser cooling and trapping of neutral atoms in a magneto-optical trap, followed by Rydberg spectroscopy and reliable single-atom trapping. Generated programmable optical-tweezer arrays using a spatial light modulator (SLM) and characterized an acousto-optic deflector (AOD) for rapid beam steering. Integrated and characterized the microscope objective and imaging system for atom-resolved detection. Developed a computer-interface and control system to coordinate lasers, optics, data acquisition and experimental sequences. Created algorithms for atom rearrangement and defect-free array generation, providing the essential foundation for scalable neutral-atom quantum computing experiments.

SECTOR IMPACT

PHARMACEUTICALS

Simulate molecular interactions to accelerate candidate screening and improve discovery of complex drugs and therapies.

MATERIALS

Model strongly correlated systems to support discovery of advanced batteries, catalysts and quantum materials.

LOGISTICS AND FINANCE

Explore quantum optimization for scheduling, routing, portfolio construction and resource allocation.

RESEARCH AND DEFENCE

Programmable quantum simulation, secure-technology research and advanced computation for mission-critical modelling.

MILESTONES & STATUS

OCT, 2024
Neutral-atom quantum technology group formally established and experimental programme initiated

JUN, 2025
Demonstrated optical-tweezer array generation, laser cooling, neutral-atom trapping and single-atom confinement.

FEB, 2026
Installed dedicated platform, optimized single-atom imaging and implemented scalable trap geometries.

DEC, 2026
Targeting demonstration of calibrated single-qubit gate operations on trapped neutral atoms

APR, 2027
Demonstrate two-qubit gates and scale processor capacity from 25 to 400 physical qubits.

DEC, 2027
Address real-world problems through hardware abstraction, user cloud access and application pilots.

CURRENT STATUS
TRL 4-5; laboratory prototype demonstrates atom trapping, array rearrangement and calibrated quantum operations; application benchmarking and partner-led validation are underway.



Lead PI -
Saptarishi
Chaudhuri,
Professor,
RRI
Bangalore,



Prof.
Kanhaiya
Pandey,
Associate
Professor, IIT
Guwahati,



Prof. Ajay
Wasan,
Professor, IIT
Roorkee



Prof. Ashok
Mohapatra,
Associate
Professor,
NISER
Bhubaneswar



Prof. Utpal Roy,
Associate
Professor, IIT
Patna



Prof. Rejish
Nath,
Associate
Professor,
IISER, Pune



CONNECT WITH US



Hexaton – six qubit photonic system

Programmable photonic qubits for
cybersecurity keys

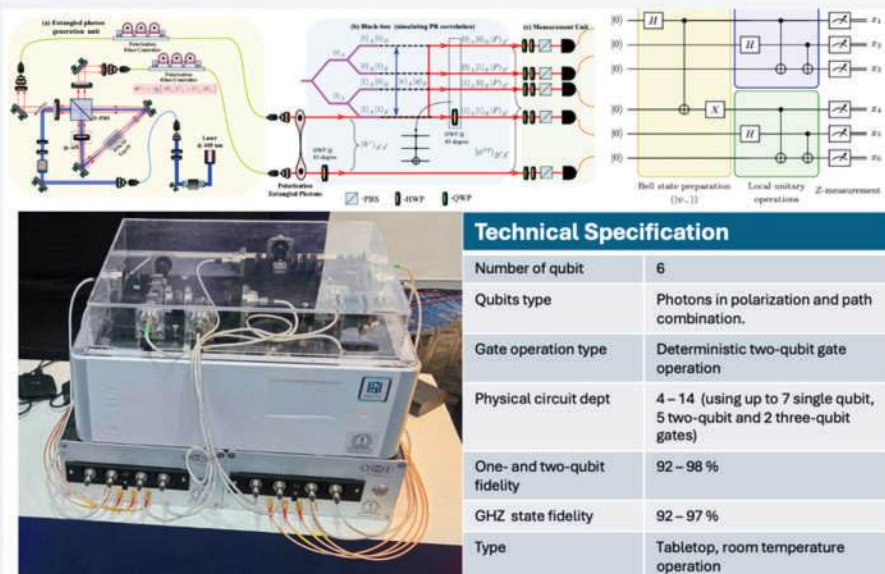
INNOVATION OVERVIEW

PROBLEM: Current cybersecurity keys are generated using mathematically difficult problems, and their security relies on computational assumptions. These assumptions may become vulnerable with the advent of advanced quantum computers solving such problems.

SOLUTION: Generation of cybersecurity keys from an engineered quantum states of a quantum computer will secure keys from possible attacks. The keys which rely on quantum correlation and inherent randomness plays a key role in securing keys. Indigenously developed six qubit photonic system will allow us to engineer quantum state in various configuration to generate cryptographically secured keys

KEY BREAKTHROUGHS

1. Deterministic two-qubit gate implementation in photonic systems
2. Novel algorithms for generating real-time verifiable random numbers as well as public and private keys.
3. Configurable four- and six-qubit photonic state generation for generation of cryptographically secured private and public keys



Technical Specification

Number of qubit	6
Qubits type	Photons in polarization and path combination.
Gate operation type	Deterministic two-qubit gate operation
Physical circuit dept	4 – 14 (using up to 7 single qubit, 5 two-qubit and 2 three-qubit gates)
One- and two-qubit fidelity	92 – 98 %
GHZ state fidelity	92 – 97 %
Type	Tabletop, room temperature operation

HEXATON :6-QUBITPHOTONIC SYSTEM (TRL 6)

SECTOR IMPACT

CYBERSECURITY

Quantum Secured Key Generation.
Random key, public and private
key generation

BANKING

OPTs and secured keys
for authentication

DEFENCE

Encryption
Using quantum keys

MILESTONES & STATUS

JUN, 2025
Quantum
teleportation
using
three-qubits in
six-qubit system

OCT, 2025
Benchmarking of
two- and three-
qubit gate
operations and
circuit depts

MAR, 2026
An integrated
six-qubit
prototype.

AUG, 2026
Implementation of
quantum phase
estimation algorithm
and boson sampling
in circuit-based
architecture

CURRENT STATUS
Six qubit photonic
quantum system (TRL
-6) with capacity to
implement 4 – 14
single qubit and 5,
two-qubit and 2-there
qubit gate operations



Innovation Team :
Quantum Optics and Quantum
Information Processing Group@ IISc



PI: Prof. C.M. Chandrashekar
IISc, Bengaluru

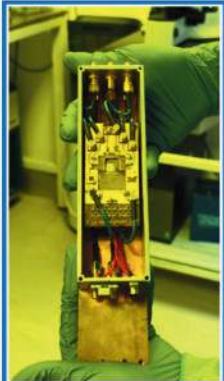


Spin Quantum Computing Group

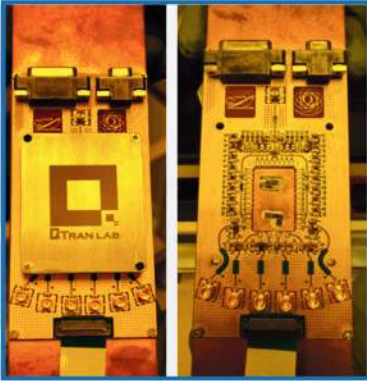
Powering India's tech future with
scalable silicon quantum computing



CONNECT WITH US



CRYOGENIC LOW NOISE QUBIT BIT MEASUREMENT BOARD WITH 1 HIGH-FREQUENCY READOUT LINE



CRYOGENIC LOW NOISE QUBIT BIT MEASUREMENT BOARD WITH 2 HIGH-FREQUENCY READOUT LINE

SAN NOISE
•ULTRA MINIATURE ON-CHIP DESIGN
•CUT-OFF FREQUENCY FC < 100KHZ.
•TOTAL AREA OF THE FILTER ~15MM2
•TEMPERATURE RANGE 300 K TO MILLI-KELVIN TEMPERATURE



μ SHIELD - 12
•COPPER POWDER-CRYOGENIC EPOXY BLEND CONSTRUCTION
•CUT-OFF FREQUENCY FC ~ 300 MHZ

INNOVATION OVERVIEW

PROBLEM: Components for classical control of quantum processing units (QPUs), operating at cryogenic temperatures, are crucial for realization of full-stack quantum computing architectures

SOLUTION: This innovation demonstrates prototype development of a few of the cryogenic classical electronic components, namely (a) cryogenic low-pass filters, (b) QPU measurement board and (c) on-chip CPW resonators.

KEY BREAKTHROUGHS

- Cryogenic components for quantum measurements
 - 1) CPW resonators
 - 2) On-chip cryogenic filters
 - 3) Qubit Measurement board
- Demonstration readiness of all of the above - Prototype

SECTOR IMPACT

QUANTUM TECH

Enabling Classical interfacing of QPUs

SEMICONDUCTORS/HEALTHCARE

Precision Measurement of high frequency, low SNR signals

DEFENCE

Frequency division multiplexing for measurement of weak signals

MILESTONES & STATUS

2025
Proof-of-concept

CURRENT STATUS
Prototype



Lead PI - Siddhasatta Mahapatra, Professor (Physics), IIT Bombay



Prof. Madhu Thalakulam, Associate Professor, IISER Thiruvananthapuram



Prof. Unditendu Mukhopadhyay, Assistant Professor (Physics), IIT Bombay



CONNECT WITH US



Quantum Computer with Silicon Qubits

AMS-RF IC based Controls & Qubits with
Foundry Silicon Advanced Nodes

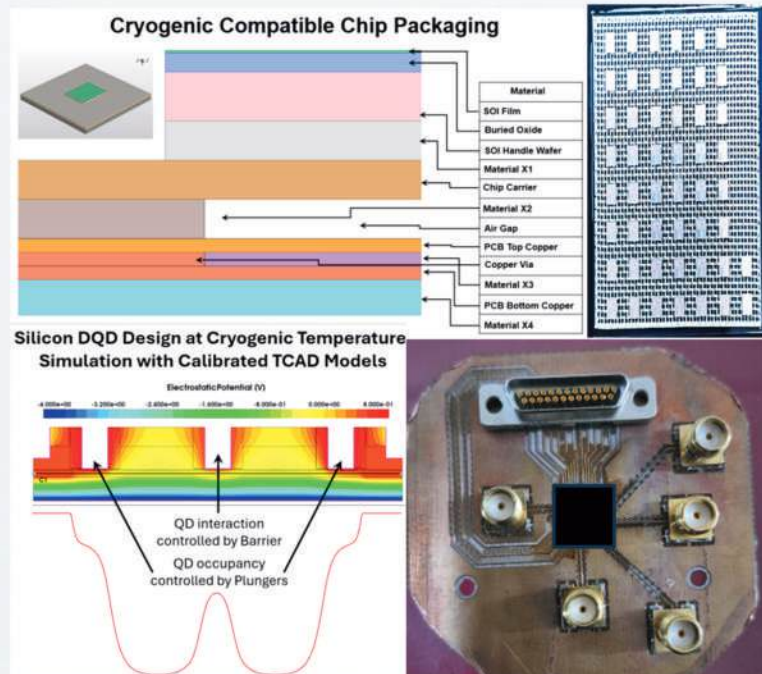
INNOVATION OVERVIEW

PROBLEM: Commercial scale quantum computers require tens of thousands of qubits and control circuitry with least process variations and high- density interconnects operating at sub-Kelvin temperatures.

SOLUTION: Our TG is developing such a solution with an advanced CMOS node Silicon foundry. Our first test-chip already achieves independent plunger and barrier gate action in a double quantum dot structure at cryogenic temperatures with our in-house cryo-compatible PCB design and packaging.

KEY BREAKTHROUGHS

- 1.Characterization and SPICE-based PDK device model development
- 2.Precise thermometry for packaged device characterization
- 3.DQD-based qubit device design, fabrication, and cryo-characterization
- 4.Cryo-compatible chip packaging and PCB design
- 5.Ultra-low noise cryo compatible LNA, MUX, and ADC/ DAC designs under progress



SECTOR IMPACT

QUANTUM COMPUTING

Qubits, Control Circuitry,
Cryo-Packaging



DEFENCE & SPACE

AMS-RF Applications requiring Low
Temperature Operation and Ultra-low Noise

MILESTONES & STATUS

- 2025** Project Start
- 2026** Foundry Cryo-CMOS Platform Development
- 2027** 2-Qubit Operation with COTS Controls
- 2028** 4-Qubit Gate Operations
- 2029** 8-Qubit Processor with Hybrid Controls
- 2030** 16-Qubit Processor with Error Correction
- 2031** 50-Qubit Quantum Computer
- CURRENT STATUS** TRL5: Lab validation of Prototype Components & Blocks

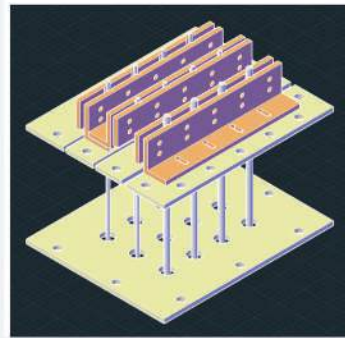


Lead PI- Prof. Abhisek
Dixit, EE-IIT Delh



Quantum Computers with superconducting qubits

Components for ultra-low noise cryogenic control and measurement chain



INNOVATION OVERVIEW

PROBLEM: All cryogenic technologies using microwave signal processing like superconducting qubit based quantum computers need low noise amplification, filters and attenuators to limit noise and scalable control electronics. There are no Indian suppliers for such components and limited suppliers globally

SOLUTION: Our TG is developing prototypes for Josephson Parametric Amplifiers (JPA), reflective filters, IR filters, cryogenic attenuators, cable assemblies and control and measurement electronics which can be commercialized to provide a low cost, high - quality domestic alternative.

KEY BREAKTHROUGHS

- Tunable frequency Josephson Parametric Amplifiers (JPA) : 20 MHz bandwidth , 4.5 - 7.5 GHz tunable band with near quantum limited performance- Impedance engineered JPA: 300 - 400 MHz bandwidth, center frequency choice in the 5 - 7 GHz range with near quantum limited performance.
- Integrated attenuators with IR filters for input lines to minimize cryogenic wiring complexity at low cost (5 - 20 dB range) ; IR filters with < 1 dB insertion loss for output lines
- Low-cost control and measurement electronics based on RFSoc technology (1 - 4 qubits)

SECTOR IMPACT

QUANTUM COMPUTING

Domestic, low-cost components for improved scalability and self-reliance



CRYOGENIC RESEARCH

These components are also useful for many areas of cryogenic research which use microwave signals for control and measurement

MILESTONES & STATUS

APR, 2025: Superconducting Qubit Technical Group starts activities

DEC, 2025: Cryogenic wiring assembly prototype tested; Broadband paramp with integrated pump; IR filters tested

MAY, 2026: Reflective filter first prototype tested; Broadband paramp packaging prototype

DEC, 2026: New cryogenic labs under NQM operational; First multi-channel cryogenic wiring installed

July 2027: Commercialization of paramps and IR filters via new startup

Current Status Prototypes have been validated in laboratory for most components and others will be validated soon

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Associate Professor IISc
Bengaluru

Prof Baladitya Suri
Associate Professor IISc
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Prof. Chetan S Thakur
Associate Professor, IISc



Lead PI - Prof. R. Vijayaraghavan, Associate Professor, TIFR, Mumbai



Prof. Vibhor Singh Associate Professor IISc Bengaluru



Prof Baladitya Suri Associate Professor IISc Bengaluru



Prof. Chetan S Thakur Associate Professor, IISc



Development of Photonic Quantum Processor

Development of fully Photonic Integrated circuits based quantum processor unit.

INNOVATION OVERVIEW

PROBLEM: Quantum photonic processors currently depend on discrete photon sources, bulk or fibre-based optical circuits, external detectors and laboratory control electronics. This leads to high optical loss, poor stability, complex alignment and limited scalability. India lacks an integrated indigenous platform combining photon generation, programmable processing, detection and electronic control.

SOLUTION: Develop an indigenous photonic-integrated quantum processor that combines on-chip single-photon emitters, a programmable interferometric mesh, integrated single-photon detectors, and custom control electronics. The platform will enable generation, manipulation and detection of quantum states on-chip and feed-forward for scalable, programmable quantum information processing.

KEY BREAKTHROUGHS

The group is developing an indigenous, scalable photonic quantum computing platform targeting a 100-mode Boson sampling system and a 50-mode fusion-based processor. Key breakthroughs include wafer-scale silicon nitride photonics with 2% uniformity, ultra-low-loss waveguides, state-of-the-art fibre-chip coupling, high-extinction on-chip beam splitting, and heterogeneous integration of photon sources, phase shifters and detectors. The team has demonstrated single-photon emitters with 85% purity, high-Q resonators exceeding 77 million for heralded photon generation, and scalable wafer fabrication. These advances establish the core technology for compact, room-temperature, fully integrated quantum photonic processors capable of complex programmable quantum operations.

SECTOR IMPACT

QUANTUM COMPUTING



FINANCE



SECURE COMMUNICATION

MILESTONES & STATUS

2028
Demonstration of on-chip 24-mode Gaussian boson sampling

2030
Demonstration of on-chip 50-mode Boson Sampling.

2030
Fusion-based 16 mode entangled photon states with on-chip single-photon sources and detector.

2031
Packaged photon emitter and detector product.

CURRENT STATUS :
Commercial-grade photonic wafer. Established a scalable platform for photonic integrated circuits.
· Demonstrated stand-alone single-photon source.



Lead PI - Prof Shankar Kumar Selvaraja
IISc, Bengaluru,



Dr. Akshay Singh
IISc, Bengaluru



Prof. Jaydeep Basu,
IISc Bengaluru



Edmund Optics

Precision Optical Components Enabling Quantum Technologies

INNOVATION OVERVIEW

PROBLEM: Quantum systems demand precise control of light, polarization, beam alignment and optical stability. Researchers and technology developers need reliable, compatible optical components and precision optomechanics to accelerate laboratory development, system integration and transition from experimental setups to scalable quantum platforms.

SOLUTION: Edmund Optics enables quantum technology development with a comprehensive portfolio of precision optical components, laser sources, polarization optics, fibers, isolators and optomechanics, complemented by application engineering support and scalable sourcing for research and advanced technology laboratories.

KEY BREAKTHROUGHS

- **Quantum Computing & Atomic Systems** – Polarizing cube beamsplitters, optical waveplates and optical filters for trapped-ion and neutral-atom applications.
- **Precision Laser & Photonics** – Single-frequency turnkey lasers at 532, 639 and 1064 nm, supporting precision quantum optical systems.
- **Polarization & Fiber Optics** – Polarization-maintaining fiber-optic patchcords with polarization extinction ratios up to 25 dB, along with achromatic waveplates and retarders.
- **Optical Isolation & Stability** – Optical isolators providing up to 67 dB isolation for improved optical-system stability.
- **Precision Beam Manipulation** – Broadband dielectric $\lambda/10$ mirrors with enhanced reflectivity and laser-induced damage threshold, supporting demanding beam-control applications.
- **Precision Optomechanics** – Ultraprecision kinematic mounts, stainless-steel optical mirror mounts, adjustable-height post holders and linear translation stages for accurate alignment and positioning.
- **Advanced Imaging Optics** – NIR achromatic lenses and aspheric lenses for increased resolution and smaller spot sizes, plus glass-thickness-compensated infinity-corrected objectives with ultra-long working distances.
- **Quantum & Research Laboratory Infrastructure** – Optical tables and isolation systems, motion control, tube systems, broadband light sources, beam manipulation, laser sources and measurement/detection solutions.

Enabling Quantum Innovation

Edmund Optics brings together precision optics, photonics, laser systems and optomechanics to support quantum computing, sensing, communication and precision measurement.

SECTOR IMPACT

QUANTUM
COMMUNICATION

QUANTUM
SENSING

QUANTUM
IMAGING

QUANTUM
COMPUTING

MILESTONES & STATUS

Global Legacy
since 1942

In India
Since 2019

Now launching our
experience center in Blore
in 2026



Deepthi Sasikumar
Senior Sales
Manager Asia



Dashrath Rana
Sales manager
India



Jayesh J Nair
Application
Engineer Lead



Archana Bharathi K
Business
Development





QUANTUM SAFE ECOSYSTEM

*BUILDING QUANTUM RESILIENCY, NURTURING &
ADVANCING QUANTUM INNOVATIONS*

QUANTUM TECHNOLOGY LANDSCAPE





CONNECT WITH US

Data Security
Council of IndiaNational Strategy · Neutral, Trusted Think Tank
· Research Productisation · Innovation ·
Assurance · Resiliency

INNOVATION OVERVIEW

India's quantum ecosystem is advancing rapidly, but critical gaps remain across research commercialisation, independent assurance, leadership preparedness, capability discovery and sector-specific adoption. Strong research and emerging technologies need clearer pathways to move from labs into trusted, deployable products and large-scale use.

DSCI works across the quantum value chain, bringing together government, regulators, researchers, startups and industry to translate national priorities into indigenous capability, trusted technology adoption, sectoral preparedness and long-term resilience.

KEY BREAKTHROUGHS

National Strategy & Policy

Contributed to early technology foresight, the evolution of the National Quantum Mission ecosystem and India's roadmap for quantum resiliency.

Research Productisation

Built pathways for academic and applied research to move into commercial products, with 10+ research efforts productised into deep-tech solutions and startups.

Independent Assurance

Developed expert-led assessment mechanisms for emerging technologies, including mathematical evaluation of indigenous PQC algorithms and independent QRNG assessment.

Ecosystem Adoption

Built regulator engagements, vendor-neutral cohorts, credentials, strategic forums, technology platforms and hands-on experimentation to accelerate informed adoption.

SECTOR IMPACT

GOVERNMENT & REGULATORS

Supports national roadmaps, policy thinking, sector-specific guidance and implementation pathways for emerging quantum technologies.

RESEARCH & STARTUPS

Connects researchers with startups, engineering capability, industry validation and market opportunities to accelerate productisation.

INDUSTRY & CRITICAL SECTORS

Runs vendor-neutral cohorts, use-case discussions and adoption programmes across BFSI, CII, GCCs and strategic sectors.

LEADERSHIP & TALENT

Builds strategic understanding through curated programmes, credentials, workshops and focused engagements.

MILESTONES & STATUS

2015

TIFAC (DST) committee that led to NQM

2019

First Quantum Startups Incubated & Accelerated

2024

India's first sovereign PQC-HSM, developed by DSCI, IIT-K and JISA

2025

India's 1st professional credential & assurance

FEB 2026

Authored India's timelines for DST's Quantum Safe Ecosystem in India document

2026

RBI Q-SAFE; SEBI cohort; Quantum summits

CURRENT STATUS

Sector cohorts; Regulator engagement; postquantum.in



Vinayak Godse
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Innovation



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DEPARTMENT OF
SCIENCE & TECHNOLOGY



PRAGATI Q-FOUNDRY 2026



INDIA'S QUANTUM TECHNOLOGY LANDSCAPE

SEPTEMBER 2026