Department of Science & Technology
Monthly Report
September, 2024

I. Important policy decisions taken and major achievements during the month:

A. Technology Development

- International Advanced Research Centre for Powder Metallurgy and New Materials (ARCI) has developed (in-house) a self-powered photodetector based on 1D-TiO2-3D-CdS hetero-structure fabricated at low temperature for Broadband Photo-detection. Under the DST-TRC Project, a thermal energy storage prototype of 1kwh capacity at constant temperature, utilizing phase change material (PCM) capsules, was assembled and successfully integrated with an existing parabolic trough collector (PTC) at ARCI to store solar thermal energy and porous carbon spherical particles have been prepared by hydrothermal route for Li-S batteries.

- Researchers at Centre for Nano and Soft Matter Sciences (CeNS), in collaboration with JNCASR, have developed an affordable Electrochromic Smart Window (ECSW) solution to address the global energy demand for building heating and cooling, which accounts for over 30% of energy consumption. By eliminating costly ITO and utilizing a thin 260 nm WO3 film, the team has created an ITOfree, all-tungsten ECSW with minimal transmittance (~3%) and full opacity. This innovation holds great potential for large-scale production, offering both energy efficiency and enhanced privacy. The project, supported by the Department of Science and Technology, represents a breakthrough in sustainable smart window technology.

B. Science for Society

- Indian Institute of Astrophysics (IIA) along with Department of School Education, Leh organized an introductory workshop 'Hanle Dark Sky Reserve' for high school teachers of government schools in Leh District.

- As a part of public outreach activities, a team from Indian Institute of Geomagnetism (IIG) visited the St. Joseph High School, Kalamboli, Navi Mumbai on 20th September, 2024. The team interacted with approximately 300 students of Class 7th. During this 2-hour interaction the students were introduced to the concepts of Space weather and Earthquakes.

- Indian National Academy of Engineering (INAE) celebrated National Engineers Day on 15th September 2024 (Sunday) by conducting an online event comprising of lectures focused on the theme "Engineering Innovations in Medicine: Pioneering Advances at the Intersection of Technology and Healthcare". The event successfully brought together leading experts to discuss the transformative impact of engineering innovations in the healthcare sector. The insights shared during the session underscored the importance of

collaboration between engineering and medical fields to address healthcare challenges in India, particularly for under privileged populations. The online event was appreciated by all participants and delegates.

- Engineers Conclave 2024 (EC-2024), an annual mega event was organized by the Indian National Academy of Engineering (INAE) jointly with major engineering institutions of the country and Defence Research and Development Organization (DRDO) on September 26-27, 2024 at the prestigious Defence Research and Development Laboratory in Hyderabad. This year's Engineers Conclave was a grand celebration of engineering excellence, knowledge sharing, and collaboration showcasing the R&D success stories of DRDO and Industry for Defence Applications. Two themes focusing on "Additive Manufacturing for Defence Applications" and "Defence Manufacturing Technologies" were chosen keeping in view the current national priorities and interests. The event brought together engineers, scientists, researchers, and industry leaders to explore and discuss cutting-edge technologies and advance state-of art in terms of indigenization in chosen areas.

- The National Academy of Sciences (NASI) organized a two-day event on 'Technological empowerment of women in natural resource management (conservation & utilization)'as part of its Science & Society mission on September 09 & 10, 2024 at RGU, Itanagar in hybrid mode. The event was organized in joint collaboration with RGU & NER Chapter of NASI. More than 150 participants including students, researchers, faculty members from RGU and other academic institutions including some eminent Scientists, NASI Fellows, Members from NER and officials of NASI participated in this event. The eminent scientists / speakers addressed the issues related to the subjects of S&T intervention with special reference to the empowerment of women in natural resource management. A two-day lecture workshop and hands on experiments were organized on theme- "Training on Chemistry for budding Scientists" in the Department of Chemistry, Ewing Christian College (ECC), University of Allahabad, Prayagraj during September 13-14, 2024. 100 higher secondary level science students and their teachers participated in the programme. The objective of the program was to create awareness about chemistry in the minds of the students and to understand about the basic concepts of Chemistry.

- North East Centre for Technology Application and Reach (NECTAR) in collaboration with Dibrugarh University, recently organized a highly successful workshop on Digital Transformation, attracting more than 500 enthusiastic participants. The event provided an insightful exploration of emerging technologies critical for Industry 4.0, covering a wide array of cutting-edge innovations, including mapping and agriculture drones and 3D printing products.

- NECTAR reported that the second batch of the Remote Pilot Certificate (RPC) program at JN College, Boko, Assam, has successfully completed their training, with 07 students clearing the certification test. The RPC program focuses on equipping participants with essential skills in operating drones, a rapidly growing technology with applications across various sectors including agriculture, mapping, and disaster management. An Agricultural

Drone Exhibition was held at Morigaon College on 12th September 2024, in collaboration with the North East Space Movement (NESM), NECTAR, and Poohar Agro Producer Company Limited. The event showcased the latest advancements in drone technology for agriculture, focusing on how drones can transform farming practices through precision farming, crop monitoring, and efficient pesticide application.

- National Innovation Foundation (NIF) has organized a workshop for herbal healers in the East Mandla forest division of Madhya Pradesh's Mandla district on September 5, 2024 where over 50 healers, farmers, and forest dwellers from the Mawai, Bichhia, and Motinala ranges participated and shared their traditional knowledge. During the workshop, key indigenous practices were documented, and technological challenges related to millet processing, Sal seed extraction, and the cultivation of paddy and maize were identified. The aim was to address these challenges through grassroots innovations, empowering local communities and enhancing their livelihoods. NIF has organised an awareness program on Grassroots Innovations in Khazhakeno Village, Phek district, Nagaland on September 12, 2024 where about 50 participants including farmers, villagers, herbal practitioners and innovators from district had participated. In this program a brief about NIF and the importance of grassroots innovations were shared with them. An exhibition of grassroots innovations was also organized on the sidelines of the workshop.

- A Mission Stroke programme was conducted by Sree Chitra Tirunal Institute of Medical Sciences and Technology (SCTIMST) in collaboration with NCD division, Govt of Kerala, Indian Academy of Neurology (IAN) and Kerala Association of Neurologists (KAN). In this ground breaking move SCTIMST aimed at combating the devastating effects of stroke. Kerala was the first state in India to launch the ‘Mission Stroke’ initiative. This was aimed at raising stroke awareness, ensure timely medical intervention and enhancing treatment outcomes for stroke patients. The initiative was rolled out in Pathanamthitta district.

- Technology Information Forecasting and Assessment Council (TIFAC) Scientist conducted workshop on Technology Foresight on 29th August and 30th August, 2024 for Indian Information Service (IIS) Group ‘A’ Officer Trainees for their On-the-Job Training at IIMC, New Delhi.

- Under the Technology assessment vertical, TIFAC initiated the assessment of an Indigenously developed technology on microbial consortia towards providing solutions for the organic waste & sludge reduction and disposal of human waste in liquid form in partnership with M/s Ioners India Pvt Ltd.

- Agharkar Research Institute (ARI) was awarded “Best AICRP-Wheat Centre” by the Indian Council of Agricultural Research, New Delhi, at All India Wheat and Barley Workers meet held at Acharya Narendra Dev University of Agriculture and Technology, Ayodhya on 11 September 2024.

- The INSA-AASSA Symposium on 'Science Policy Futures for Asia,' was successfully

organized by INSA in its premises from September 1-3, 2024, in New Delhi. During the symposium experts from AASSA member academies, International Science Council (ISC), Inter Academy Partnership (IAP), INSA etc., gathered to discuss emerging science policies shaping Asia's future. The symposium fostered collaboration across diverse fields, emphasizing innovation, sustainability, and the role of science in addressing regional challenges. The INSA-NASEM Workshop was held from September 9-11, 2024, at the Indian National Science Academy in New Delhi. This brought together scientists and policymakers to discuss collaborative research and policy development in critical areas like biotechnology, health, and environmental sustainability. The workshop focused on strengthening Indo-U.S. ties, sharing best practices, and fostering innovation through joint initiatives.

- The Foundation stone for India's first of its kind CO2 to methanol pilot plant with an overall capacity of 1.4 tons per day was unveiled virtually by Secretary, DST on 15th September 2024.

- DST participated in the workshop on "Aquifer Recharge and Storage Technology", organized by Manav Rachna Institute of Research and Studies, Faridabad, on 19th September 2024.

- DST participated in the Second International Conference on Green Hydrogen (ICGH) 2024, organized by the Ministry of New and Renewable Energy (MNRE) and the Office of the Principal Scientific Advisor (PSA), held from September 11th to 13th, 2024, at Bharat Mandapam, New Delhi. During ICGH 2024, DST organized a poster session, a quiz competition, and a hackathon as part of the conference.

- Department of Science and Technology (DST) & National Research Development Corporation (NRDC) organised a joint session on Advancing Energy Efficiency in India's ceiling Fan Market at DST on September 26, 2024.

- The 1st Meeting of the National Expert Committee (NEC) of Climate Change Programme, was held on 17th-18th September, 2024 at IIT Delhi's Research & Innovation Park. In the meeting, the progress of State Climate Change Cells (SCCCs) established in 30 states and UTs under the National Mission for Sustaining the Himalayan Ecosystem (NMSHE) and National Mission on Strategic Knowledge for Climate Change (NMSKCC) were reviewed. Further, Technology Need Assessment (TNA) project was also reviewed in this meeting. Presentations were made by PIs from various state departments, highlighting mid-term and final reviews of projects aimed at strengthening climate resilience.

- Under its Climate Change Programme (CCP), DST issued a call for proposal in Urban Climate Research and Extreme Events. A detailed analysis of 322 proposals received under the recently closed call (closed on 19th September 2024) is being processed for screening. Each proposal will undergo a thorough evaluation by the subject expert members.

- DST participated in the National Security Council Secretariat (NSCS) meeting held on 3rd September 2024 and contributed to discussions on High-Risk Glacial Lakes in the Himalayas, focusing on the Glacial Lake Outburst Flood (GLOF) phenomenon and proposing strategic mitigation measures.

- The Green India Mission Governing Council meeting organized by MoEF&CC was held on 4th September 2024 in which DST participated. During the 2nd National Governing Council meeting, progress reports from various states were evaluated and constructive suggestions were offered to enhance mission outcomes.

- The Empowered Technology Group virtual meeting was conducted on 10th September 2024 in which DST participated and provided key inputs on the "Mission Mausam" initiative by the Ministry of Earth Science.

- DST participated in the Royal Society of Chemistry Townhall meeting held on 11th September 2024, and shared DST's perspectives on fostering interdisciplinary approaches in science education and research, emphasizing the importance of collaboration across scientific fields.

- DST attended the 25th Meeting of the Scientific and Technical Advisory Group (STAG) on the implementation of the National Mission on Himalayan Studies (NMHS) on 14th September 2024 organized by MoEF&CC, New Delhi and reviewed the new projects under NMHS.

- An Expert Committee (EC) Meeting to review the performance of 16 ongoing & 06 completed projects under Strengthening, Upscaling & Nurturing Innovations for Livelihood (SUNIL) & other Network (Technological Intervention for Addressing. Societal Needs (TIASN) & Arid, Semi Arid and Cold Desert Regions (ASACODER)) programmes, was held at Swami Rama Himalayan University (SRHU), Dehradun during 22nd & 23rd August, 2024.

- An Expert Committee (EC) meeting to review the performance of 31 ongoing & 08 completed projects under Scheme for Young Scientist and Technologists (SYST) programme, was held at CSIR-NPL, New Delhi during 23rd and 24th September 2024.

- An Expert Committee Meeting for Scheduled Caste Sub Plan (SCSP) and Tribal Sub Plan (TSP) " was held during 18-20th September 2024 at UCOST, Uttarakhand.

- CSIR-NML, Jamshedpur created waste management training facilities and developed a Common Facilitation Center for Women's training and empowerment under STW (S&T for Women) programme.

- NIAMT, Ranchi with the help of the Software Technology Park of India, Ranchi developed the Incubation Center and Innovation and Entrepreneurship Development Centre under STW

(S&T for Women) programme.

- CSIR-IHBT, Palampur published a manuscript entitled “Importance/ use/ Agrotechnology/ post-harvest products for both Artemisia brevifolia and Melissa officinalis” under Strengthening, Upscaling & Nurturing Innovations for Livelihood (SUNIL) programme.

- DRI, Chitrkot published a paper on “Standardization of Traditional Herbal Formulation (Kajal), Used for Eye Care in Chitrakoot region, Madhya Pradesh” under Strengthening, Upscaling & Nurturing Innovations for Livelihood (SUNIL) programme.

- System of Wheat Intensification [SWI], System of Maize Intensification [SMI], Turmeric Processing technologies deployed by VIKSAT, Ahmadabad has impacted 35 villages, 17 Individual entrepreneurs from 15 villages, 06 SHGs of 70 members from 05 villages and created a SAFE - FPO’s of 254 members under SUNIL programme.

- VIB, Nimpith developed three packages (each for Coastal Saline, Red & Laterite and Vindhyan Alluvial zone) for paddy and evaluated for techno-economic viability. An average increment of farm income Rs 10869 / ha (35.92%) was estimated with decrease in fertilizer cost Rs 523 /ha (5.42%) and pesticide cost Rs 3106 /ha (51.87%) under SUNIL programme.

- 02 new projects and 17 ongoing projects were supported with an expenditure of Rs. 0.27 cr and 5.1 cr.

- Ongoing and completed projects yielded 15 publications in National and International journals.

- 05 successfully completed projects were closed.

- DST celebrated the achievements made under its National Initiative for Developing and Harnessing the Innovation (NIDHI) programme during last 8 years on 6th September, 2024 at Foundation for Innovation and Technology Transfer (FITT), Indian Institute of Technology (IIT), New Delhi. The impact of the programme was well recognized by media, stake holders and public. Setting up of the 8 inclusive Technology Business Incubator (iTBI) during the 100 days target of Govt. of India was met and iTBIs were virtually inaugurated during the programme. DST-Gopalakrishnan Deshpande Center for Innovation & Entrepreneurship (GDC), IIT, Chennai (DST-GDC) incubate programme for Deeptech Startups was also launched during the programme.

- DST organized a Brainstorming Session on Advanced Materials aligned with Vision of Vikshit Bharat 2047 focusing on 14 thematic research areas with a participation of over 100 eminent scientists and experts from academia/Industry during 2nd – 3rd September 2024 at IIT Hyderabad.

- Second Expert Advisory Committee meeting on Advanced Materials was conducted on 3rd

September 2024 at IIT Hyderabad to prepare vision document on Advanced Materials under NPNST, DST.

- DST recently announced a call for proposals on “Advanced Materials” to promote the basic and applied research activities on the thrust research areas of advanced materials, which is in line with Vision of Vikshit Bharat 2047.

- First Steering Committee Meeting of India @ KEK was held on 4th September 2024, where the implementation of the Phase III of the INDAI@KEK photon factory project was discussed. During the meeting, draft the Memorandum of Understanding and agenda for the Bilateral Steering committee to be held later in the month were a;sp discussed.

- First Steering Bilateral Committee of India @ KEK was held on 17th September 2024. The terms and conditions for the MoU was discussed from both Indian and Japanese side. The revised beamline lease was discussed and agreed to. KEK Photon Factory Japan also waived off the beamline lease cost for one year.

- Steering Committee Meeting of India @ DESY was held on19th September 2024 and the proposal for 2 years extension of the collaboration with financial support was recommended for support by DST. Secretary DST signed the Letter of Intent for participating in PETRA IV at DESY Germany.

- Survey of India was honoured with the Jury Award in the Geosaptial Enabler Category by the FOSSEE Project, IIT Bombay during the Open Source GIS Day’ celebrations at Prof. B. Nag Auditorium, Victor Menezes Convention Centre, IIT Bombay on September 15, 2024.

- MoU has been signed between National institute for Geo-informatics Science & Technology (NIGST), Survey of India and CSIR, National Geophysical Research Institute (NGRI) on 04th September, 2024 to foster collaboration between SOI's capabilities in geo-informatics and mapping technologies and NGRI's expertise in geophysical research.

C. Human Capacity Building

- The Department of Science & Technology (DST) launched ‘Women in Space Science Leadership Program (WiSLP)’ in collaboration with British Council as part of UK-India Education and Research Initiative (UKIERI). Coventry University (UK) is the delivery partner under this program. A framework design workshop was organized under this program by DST on September 24, 2024 to take the views of early career researchers, academic leaders, and policymakers to ensure the effectiveness of the leadership framework in this unique context.

- Under Vigyan Jyoti, 5 Regional Conclaves at IISER Mohali, IIT Guwahati, State Institute for Management of Agriculture (SIMA), Lucknow, NIT Durgapur and IISER Pune, have been organized during September. The Vigyan Jyoti Scholars has interacted with Eminent

Scientists and Academicians of these institutes. These conclaves aim to inspire and provide insights into future career paths, innovations in STEM fields, and hands-on exposure to various scientific concepts.

- Under Vigyan Jyoti Programme, 89 Career Counselling sessions, 2 C-STEM sessions, 166 Role Model interactions, 85 Knowledge Partners (KP) visits, 87 Tinkering workshops, 38 Science camps, and 3170 Subject-specific lectures have been conducted for Vigyan Jyoti scholars.

- Under WISE Post-Doctoral Fellowship (WISE-PDF), 7th meeting of Subject Expert Committee (SEC) on Life Sciences was organised at Indian National Science Academy (INSA), New Delhi, on September 26-28, 2024. The PIs of 60 projects presented their proposal before the SEC for its final recommendations. SEC has also reviewed progress of Twenty-Seven (27) ongoing projects and Seven (7) Project Completion Reports supported under Women Scientists Scheme-A (WOS-A).

- Under INSPIRE-MANAK (Innovation in Science Pursuit for Inspired Research - Million Minds Augmenting National Aspiration and Knowledge) Scheme, (i) DST organized 11th National Level Exhibition and Project Competition (11th NLEPC) of INSPIRE-MANAK during 17-18th, September 2024 at Hall No.2, ITPO, Pragati Maidan, New Delhi; (ii) Winners Felicitation Ceremony of 11th NLEPC was held on September 19th 2024 at Vigyan Bhavan, New Delhi; (iii) 31 students were selected from 350 Participants from 33 States/UT's and KV & NVS; (iv) 10,000 students from Delhi & NCR visited during the exhibition at ITPO, New Delhi; (v) Around 7.98 Lakh nominations have been received till date for the F.Y. 2024-25 from all the States/UT's; the date has been extended till 15 Oct 2024 for the online nomination for INSPIRE-MANAK; (vi) 39 teacher workshops and 7 DNOs meeting were organised to mobilize the nomination for the year 2024-25; (vii) Following are Top 3 Students selected from 11th NLEPC:

Sl No.	Name of the students	State	Idea / Innovation title
1	Deepak	Madhya Pradesh	Safe Vision Distance Sensor in Smart Phone
2	Aanay Dwivedi	Uttar Pradesh	Pothole Repair System using Plastic Trash
3	Amulya Hegde	Karnataka	Flood Detecting Pole

- Under INSPIRE Internship, Science camp was organized at Mar Augusthinose Educational and Charitable Trust, Kottayam, Kerala, during 23-27th sept, 2024 which was attended by 151 students.

- Under INSPIRE Scholarship, ₹14,96,60,000/- was released towards Scholarship for 1406 ongoing students.

- Under INSPIRE Fellowship, ₹5,03,960/- was released towards Fresh Fellowship for 01 INSPIRE Fellows; ₹34,40,85,260/- was released towards Ongoing Fellowship for 667 INSPIRE Fellows. 49 INSPIRE Fellows have been converted from JRF to SRF; INSPIRE Fellowship SEC meeting for Engineering Science was held on 30th September 2024 at IISER Pune. 20 New applications and 5 Re-evaluation applications were evaluated.

- Under INSPIRE Faculty Fellowship, ₹22,00,000/- was released towards Ongoing Faculty Fellowship for 01 INSPIRE Faculty Fellow. Approval of ₹11,55,000/- has been obtained for the release of 73 beneficiaries.

- The University of Kashmir organized a three-week Capacity Building Program (CBP) in Glaciology from 2nd to 22nd September 2024 under the DST-Centre of Excellence for Glacial Studies. This program aimed to enhance the skills of early-stage PhD students and researchers in glacier dynamics and climate change impacts in the Himalayas, featuring expert lectures and hands-on training at Machoi Glacier.

- Task Force on Himalayan Agriculture implemented several capacity-building programs, including a Parthenium eradication drive, mango orchard rejuvenation demonstration, high-yielding maize variety introduction, fish pond management guidance, and rooftop water harvesting training. These activities were conducted to enhance agricultural productivity and sustainability across the Himalayan region.

- Task force-3 phase II on Forest Resources and Plant Biodiversity conducted 05 Capacity Building programs on various themes such as plantation campaigns, Swatha he Sewa, awareness programs regarding various climate issues, Knowledge sharing and networking, etc. These activities/programs benefitted 208 individuals.

- A meeting was held on 3rd September 2024 with Prof. K.C. Tiwari from DTU. The meeting was convened to discuss the standardization of the Geospatial Education and Skilling Ecosystem. The primary objective of this standardization is to ensure consistency, clarity, and alignment with industry needs in geospatial education. Prof. K. C. Tiwari delivered a presentation, emphasizing the necessity of standardization, particularly given the evolving multidisciplinary nature of geospatial science and technology. He also outlined the current challenges and gaps in nomenclature, course content, and accreditation. The discussion underscored the significance of collaboration between academia and industry, as well as the need for accrediting bodies to recognize geospatial science and technology as an emerging field.

- As a part of the Indian Delegation, DST participated in virtual mode in the 3rd Meeting of the BRICS on Geospatial Technologies and applications held from 16th to 17th September 2024. During the meeting, DST gave a 15 minutes presentation on Geospatial Ecosystem of India: Current status and future Roadmap.

- DST virtually participated in the 20th Meeting of the Central Geological Programming

Board (CGPB) Committee-VI on “Marine Geology & Exploration and Coastal Geoscience” held on 25th September 2024. The meeting discussed the committee's responsibilities in planning and reviewing geoscientific activities, particularly related to marine and coastal areas.

- Officers of DST attended the seminar on "The Role of Geospatial Technologies for Disaster Risk Mitigation and Management" held on 26th September 2024 at FICCI, New Delhi. DST chaired the technical session on “Interoperability and Sharing of Spatial Data with Reference to Disaster Management”. A talk was delivered on “Effective Policies and Innovative Strategies for Quick and Economical Management of Spatial Data”.

- A Project Screening Committee on Geospatial Technology and Solutions was convened on 26th and 27th September 2024 at IIT Delhi. 280 proposals were received under the Call for Proposals. The meeting was convened to initiate the shortlisting process for the proposals received under various key focus areas.

D. Scientific Research

- A study by Aryabhatta Research Institute of Observational Sciences (ARIES) scientists has unveiled powerful flares erupting from the scorching and thin outer atmosphere called corona of a very young star AB Dor. This study was conducted using a treasure trove of X-ray data spanning over four decades.

- There has been a significant rise in cancer-related mortality in the Ladakh region during the last 10 years. The most common type of case is gastrointestinal cancer. In a study, scientists of Birbal Sahni Institute of Palaeosciences (BSIP) assessed heavy metal contamination in groundwaters and associated human health risks. The results indicate that 46–96% of the groundwater samples have heavy metal pollution with a health hazard index > 1, which means using these groundwaters for drinking, food preparation, and agriculture is likely to result in carcinogenic and non-carcinogenic health hazards. The main heavy metal contaminants found in the groundwater of the Leh district include Cr, As, Hg, and U. According to the health risk assessment, 46–76% of the groundwater samples contain unsafe levels of Cr and As. Prolonged exposure to these levels is likely to cause gastrointestinal cancer in the local population. Acute to chronic exposure to U and Hg concentrations present in some groundwater samples is likely to result in various non-carcinogenic health risks.

- Researchers of Centre for nano and Soft matter Sciences (CeNS) have studied the pathway complexity in peptide supramolecular self-assembly, focusing on the interplay between kinetic and thermodynamic states. A novel multiresponsive chiroptical switching phenomenon influenced by temperature, denaturation, and cosolvent content is reported. Particularly, chiroptical switching during denaturation marks a first in the literature, while cosolvent variation also induces notable switching effects. This phenomenon enables switchable piezoresponsive peptide-based nanomaterials, offering dynamic control over material properties. The work highlights the potential to tailor piezoresponsive behavior by

transitioning nanostructures from kinetic to thermodynamic states, presenting new opportunities into self-assembled system.

- CeNS researchers in collaboration with Manipal Institute of Technology have investigated LCs derived from 3,5-diphenyl-1,2,4-oxadiazole. Synthesis and elaborative characterization of a novel series of hockey-stick-shaped mesogens namely, methyl 4-(5-(4-n-alkoxyphenyl)-1,2,4-oxadiazol-3-yl)benzoate is presented. To reveal the structure-property correlations, the substitution on the C-3 core in the form of methyl ester group has been held constant, while the substituent on the C-5 core has been varied with different n-alkoxy tails. While the thermal gravimetric analysis confirms the thermal stability, the methodical studies on the mesomorphism using optical, calorimetric, and X-ray diffraction techniques confirmed the occurrence of smectic A and nematic phases having interdigitated and cybotactic orders, respectively. The lower and middle/higher members, respectively, show the N phase, and N and SmA phases, which follow the general trend reported hitherto for the homologues series of LC compounds. The quantum mechanical calculations using density functional theory revealed the bending angles, dipole moments, and HUMO/LUMO band gaps.

- Indian Association for the Cultivation of Science (IACS) reported the following major research finding: Critical transitions—dramatic changes in a system's state triggered by minor adjustments in external conditions—are observed across various fields, from biology and social sciences to physics. Continuous phase transitions show a strong resemblance to critical transitions, often dominated by fluctuations determining their ground state, a concept we usually understand through the Ginzburg-Landau mean field theory. However, direct measurements of these fluctuations across a phase transition have been lacking. For instance, a one-dimensional chain of atoms with electronic charges. Such chains can be unstable, but they stabilize through a periodic modulation of electrons known as charge density waves (CDWs) accompanied by lattice distortion. In a material like (TaSe4)2I—a quasi-one-dimensional crystal with infinitely long (TaSe4) chains, the CDW transition occurs at around 263 K. For the first time, scientists of IACS managed to directly measure the critical fluctuations in the order parameter via resistance fluctuations cross the CDW transition. They found that in these low-dimensional systems, order parameter fluctuations are slow enough to persist in the thermodynamic limit and dominate the phase transition over a wide temperature window. As the system approaches the critical point, fluctuations diverge, indicating early signs of a critical transition.

- Scientists of S. N. Bose National Centre for Basic Sciences (SNBNCBS) investigated ultrafast demagnetization and precessional dynamics corresponding to the Kittel and perpendicular standing spin-wave (PSSW) modes of Co2MnGa, interfaced with Pt thin films of varying thickness. The exchange stiffness constant of Co2MnGa is determined, as well as detailed information about spin-transport across the Co2MnGa/Pt interface. The interfacial spin transparency is found to reach a sizeable value of approximate to 83%, in the perfect spin-sink regime, suggesting the great potential of this heterostructure for spin-orbitronics and devices relying on ultrafast magnetization dynamics.

- Indian Institute of Astrophysics (IIA) has issued the following two press releases on recent research papers through the DST: Radio jet from dwarf galaxy discovered interacting with interstellar gas causing shock waves; Kodaikanal Tower Tunnel Telescope probes deeper into Solar secrets.

- Wadia Institute of Himalayan Geology (WIHG) reported following research findings: The expansive width of the Parkachik glacier's terminus leads to significant variations in its frontal retreat. The findings indicate that the glacier retreated by -181.33 ± 64.8 meters, where the left portion of the glacier experienced a higher retreat rate; PSInSAR study from 2017 to 2021 indicates that the total cumulative displacement observed during the span of 4 years (Feb 2017–Feb 2021) in the Kumaun Himalayan region is ± 55mm and the mean deformation rate is ±7mm/yr; Mineral chemical study of monazite of Higher Himalayan Crystalline Sequence, Dhauliganga valley, Garhwal Himalaya shows chemical heterogeneity among the grains. Petrographic study shows that most of the monazites at lower HHCS have formed under the sub-solidus condition.

- Agharkar Research Institute (ARI) published 13 research papers, Aryabhatta Research Institute of Observational Sciences (ARIES) published 08 research papers, Centre for Nano and Soft Matter Sciences (CeNS) published 10 research papers, Institute of Advanced Study in Science and Technology (IASST) published 06 research papers, Indian Institute of Astrophysics (IIA) published 15 research papers, Indian Institute of Geomagnetism (IIG) published 05 research papers, Sree Chitra Tirunal Institute of Medical Sciences and Technology (SCTIMST) published 20 research papers in various reputed national and international journals. Indian Academy of Sciences (IASc) published 99 articles in their 11 different journals. National Innovation Foundation (NIF) reported that 01 patent was granted and 03 patents were filed. SCTIMST reported that 05 Indian patents were granted and one Indian patent was filed.

E. International Cooperation

- Funding Opportunity Announcement (FOA) 2023 for Research Development and Deployment (RD&D) project has been approved under CCUS of Mission Innovation (MI) 2.0 to IISER Kolkata & University of Alberta; Canada for Constructing Chemically Robust Covalent Organic Nanotubes CONTs Coated Zeolites for Metal Free CO2 Capture and Photocatalytic CO2 conversion in Water.

- DST participated in 8th BRICS working Group on Information Communication Technology (ICT) and High Performance Computer (HPC) held in Nizhny Novgorod, Russia from 20th - 21st September, 2024.

F. National Technology Mission

National Mission on Interdisciplinary Cyber-Physical Systems (NM-ICPS)

- A Conference on "AI in Healthcare" under the NM-ICPS was organized on 5th September 2024 at IIIT Delhi. This event was held in collaboration with AIIMS Delhi and five TIHs of NM-ICPS, namely I-Hub Anubhuti (IIIT Delhi), TIH Foundation for IoT and IoE (IIT Bombay), IIIT-H Data I-Hub Foundation (IIIT Hyderabad), I-Hub Foundation for Cobotics (IIT Delhi), IITI Drishti CPS Foundation (IIT Indore). The event attracted 200 participants from medical institutions and academic organizations, including IITs. The technical sessions included talks by various experts in medical field as well as Engineering background and two panel discussions were organized on Perspective of AI in Healthcare from Medical Community & from Engineering Community.

- During the Conference, NM-ICPS Quarterly Bulletin (July, 2024 edition) indicating theme-wise highlights of the Mission achievements was officially released by Prof. Abhay Karandikar, Secretary, DST.

- The Third-Party Evaluation (TPE) Committee of the "Technology Innovation Hubs (TIHs) established under NM-ICPS", has started evaluating the performance of all the TIHs under the four major categories i.e., 1. Technology Development 2. Entrepreneurship Development 3. Human Resource Development 4. International Collaborations. The evaluation is being carried out in two phases: a virtual assessment followed by an on-site evaluation at the respective TIH location. The following visits have been completed during the month:

  i) Foundation at IIT Madras (14.09.2024)
  ii) IIITB Comet Foundation at IIIT Bangalore (18.09.2024)
  iii) I-HUB for Robotics and Autonomous Systems Innovation Foundation at IISc Bengaluru (19.09.2024)
  iv) IIT Tirupati Navavishkar I-Hub Foundation at IIT Tirupati (25.09.2024)
  v) IIIT-H Data I-Hub Foundation at IIIT Hyderabad (26.09.2024)
  vi) I-DAPT-HUB Foundation at IIT BHU (26.09.2024)

National Quantum Mission (NQM)

- 2nd Bilateral Meeting for Quantum Coordination Mechanism was held from 26th-31st August 2024 between India and USA to enhance the strategic partnership in quantum research and for aligning the research priorities of both nations.

- A workshop was conducted on Quantum Computing, Quantum Communication and Post-Quantum Cryptography (PQC) in University of California, Los Angeles, USA from 16th - 20th September 2024 wherein experts from Academia, R&D Labs & Government from both the countries, India and USA, participated. The main objective of the workshop was to foster and develop joint collaborations between both the nations.

G. Scientific Infrastructure Building

- CCP supported DST-Center of Excellence on Climate and Disaster Resilient Agriculture at Tamil Nadu Agricultural University, Coimbatore has launched a project which is aimed at

advancing agricultural resilience to climate and disaster impacts. Further, studies to illustrate relation between heat stress and health -"Chronic Kidney Disease of Unknown Etiology Exposure and Intervention Trial (CKDu-EXIT)" has been supported by Sri Ramachandra Institute of Higher Education and Research, Tamil Nadu.

- Under Fund for Improvement of S&T Infrastructure in Universities and Higher Educational Institutions (FIST), presentation meeting of Subject Expert Committee (SEC) for Earth & Atmospheric Sciences, Mathematical Sciences, Life Sciences, Engineering Sciences and Physical Sciences was held in the month of September. During this meeting, 167 departments participated and presented their proposal for support in respective subject areas of FIST Program for research infrastructure enhancement.

- Facility Management Committee (FMC) meeting was conducted for Sophisticated Analytical Instrumentation Facilities (SAIF) centre located at STIC Kochi, Kerala on 30th September 2024. This meeting was conducted to review technical and financial progress of the SAIF centre. Updates were taken on progress parameters such as publications, users, samples analyzed, earnings, etc. The committee was also appraised about status of installed instruments, working condition & downtime of the existing instruments.

- The inauguration of the Sophisticated Analytical & Technical Help Institutes (SATHI) Centre for In-Situ and Correlative Microscopy (CISCoM) at IIT Hyderabad was held on 8th September 2024, by Secretary DST, in presence of Prof B.S. Murty, Director, IIT Hyderabad and Dr. B.V.R. Mohan Reddy, Chairperson of Board of Governors, IIT Hyderabad. This facility is a national level facility and in the country and the sixth globally. It will pioneer real-time characterization across various length scales, serving fundamental research in streams such as Physics, Chemistry, Biology, Pharmacy, Geology, Metallurgy etc.