

Celebrating

International Day of Women and Girls in Science

The United Nations General Assembly has declared February 11 as the International Day of Women and Girls in Science. In this spirit, a series of four short talks is organized with each speaker telling a story about their field of work. Each speaker happens to be an upcoming science professional from TIFR-Hyderabad.

Speaker: Sonali Khanna (Graduate student, Laser physics)

Title: Light-Matter interaction

Advancement in technology has made it possible to generate ultra-short light pulses of the order of few femtoseconds having energies of few millijoules. When such pulses are focused on a small area of μm^2 can generate intensities of the order $10^{16}\text{W}/\text{cm}^2$ or higher. At such high intensities, any target material gets easily ionized within the first few pulse cycles, generating a plasma. As the intensity increases further, electrons being lighter in mass, get pushed around by the laser field while the ions remain immobile. This spatial and temporal variation of the electron and ion distributions leads to charge separation, leading to electric fields of the order of $100\text{GV}/\text{m}$, which can easily accelerate electrons to relativistic energies. This provides an opportunity for the creation of table-top accelerators in the near future. These ultra-short pulses can also be used for high spatial and temporal study of the dynamical systems.

Speaker: Prakriti Kayastha (Junior Research Fellow, Computational materials chemistry)

Title: Group theory of crystal structure preferences

Every material crystallizes in any of the 230 space group symmetries. Classic cases such as allotropes of carbon and tin remind us of the structural diversity arising from a single composition. We find that for every stoichiometry, lattices belonging to only 10% of the space groups are stabilizing. Using group-subgroup relationships, we identify configurational hierarchies across the potential energy surface.

Speaker: Anusheela Chatterjee (Science writer and Programme head - Science Media Centre)

Title: The changing landscape of science communication in India

Science communication efforts in India have seen quite some changes over the last decade. Science columns in newspapers or print media in general, that were one of the major conduits of 'taking science to the public' have diminished in length in the past few years. Meanwhile, online magazines and newsletters have emerged as a promising alternative. With podcasts, videos, art, and forums for public dialogue gaining ground, current scicomm efforts are aimed at breaking the perception that science or scientists are isolated from the public. Research institutions have been waking up to the need for a workforce that can actively engage with the public while communicating the science being done in the institute. The use of social media has contributed in building bridges. It has also opened up spaces for retrospection regarding the caveats in Indian scicomm. As a 'career scicommer', I shall engage in a dialogue on this new wave of scicomm efforts and what are the areas that we still need to improve upon.

Speaker: Pallavi Thakur (Graduate student, Materials Science)

Title: Unravelling the role of inert polymer mixed in solid state electrolyte for Li-ion Batteries

Li-ion batteries, compared to other energy storage devices, are attracting much attention in the past few decades due to their high working voltage and high energy density. Traditionally, non-aqueous liquid electrolytes are most commonly used in conventional Li based rechargeable batteries owing to their high ionic conductivity, high transference number and low electrode–electrolyte impedance. But these organic liquid electrolyte based LIBs faced a huge threat in terms of their safety, storage and transportation. Solid polymer electrolytes (SPEs) are envisioned as the promising component of safer energy storage devices but are still far beyond the scope of practical application. Semi-crystalline nature and slow dynamics of the host polymer matrix hamper the ion transport through the solid polymer network. We study the synergistic roles of Li salt (LiClO_4) and two different polymers – polyethylene oxide (PEO) and polydimethyl siloxane (PDMS), in the Li ion transport through their solid blend based electrolyte.

Thursday, Feb 13th 2020

4:00 PM (High Tea at 5:00 PM)

Auditorium, TIFR-H