



Karyashala “Astrochemistry and Cratering in Solar System” & Asteroid Day @ PRL

Duration : 4th to 10th July 2022

This unique workshop is designed to show the interdisciplinary nature of the research areas “Astrochemistry” and “Planetary Remote Sensing” and an effort to try to attract more young minds to choose this area of research in their science career. About 14 research/master degree students participated where their current area of work ranges from Geology / Applied geology, Geophysics, Physics, Chemistry / Astrochemistry and are also from different parts of the country.

The workshop had lectures by experts in the area of astrochemistry and planetary remote sensing, atomic and molecular physics, geology and biophysics as the workshop briefly touched on astrobiology – a closely associated subject to astrochemistry. In addition, we had hands on session for the participants almost every day during the workshop. They had the opportunity to see how the deep space and solar system conditions were brought in the laboratory and the physico-chemical nature of molecular ices were studied. They had the opportunity to take part in the experiment in our unique High Temperature Shock Tube for Astrochemistry (HISTA). Hands-on session on Moon and Mars datasets extraction, data analysis and interpretation were part of the catering in solar system module.

Day 1 – The workshop was inaugurated by Dr. Anil Bhardwaj, the Director of PRL, followed by talks from Dr. Varun Sheel, HoD, PSDN and Dr. R P Singh, HoD, AMOPH was there. The first lecture was on “Geology of the Moon – Remote sensing Perspective”. The lecturer gave a brief description about the cause for origin and evolution of the solar system, which was Meteoritic impact and Volcanism. The second lecture of the day was on “The Universe as a giant laboratory: The making of complex molecules from atoms”. The lecture was on the fundamentals of astrochemistry, interstellar medium and its energy sources and the recreation of such extreme conditions in laboratory. The day ended up with the discussion on poster making, 3D printing and students’ presentation.

Day 2 - started with online talk on “Challenges in conducting astrobiology research” Astrobiology, space biology, Gaganyaan, Concept of Bioastronautics, Use of Engineering and technology to facilitate healthy human inhabitation of space were discussed. The second online talk was on “Astrochemistry- simple to complex molecules; and explained about Drake equation, Kepler mission, Murchison meteorite, various astrochemical models and biomolecules. The third talk was on “Role of water in shaping Mars”. The lecturer briefly explained about the geology, atmosphere, geological timescale, past and present condition, ground water seepage and surface runoff on Mars. Later Hands-on session of Lunar Datasets. The day ended with students’ discussion.

Day 3 – First lecture was on “Chemical and Biological crystallography in Space Science where he discussed about, X-ray crystallography, SCXRD and Insitu-cryo crystallization etc. After the lecture, hands-on session with the astrochemistry experimental facility housed in PRL - like HISTA and SALT. The second lecture was on “VUV and IR spectroscopy of astrochemical ices” and explained their application in medical diagnostics, food technology and agriculture and environmental Chemistry. Later a special talk was on “3D Printing of the Sittampundi anorthosite: Indian Lunar soil simulant. It was followed by hands-on session on Mars data set. The day ended up with students’ discussion on posters and 3D printing.

Day 4 - began with hands on session of SALT, HISTA instruments; followed by a lecture on “Indian Meteorites”. The talk briefly explained on how to identify a meteorite from other rocks. Then we had a presentation on Microgravity and shock processing respectively. Later an online lecture on “Remote sensing Dataset for technical analogues” in which all aspects of remote sensing were covered.

Day 5 – The first lecture was on “Targeting Craters” in which the various criteria to identify a crater were explained. Followed by Hands-on session on Sittampundi anorthosite and meteorites was carried out. The second talk of the day was on “Mechanical behaviour of meteorites” and their importance of correlation - multiscale behaviour of meteorite samples. Then a lecture on “Electron Induced Processes for Molecules of Titan”. The lecturer conveyed that a well-studied environment that is believed to provide a mimic for a prebiotic Earth is Titan.

Day 6 – The first lecture was on “Terrestrial Analogues for planetary Exploration” with special reference to Mars and Moon. Rest of the day the participants were busy with the hands-on session on low and high temperature astrochemistry and 3D printing in preparing the posters related to the Asteroid day.

Day 7 (10 July)– This day was celebrated as Asteroid Day @ PRL. The PRL Thaltej campus was open for the visitors and almost 600 people including children, their parents and the PRL employees with family visited the event. The visits of unique laboratories that are present in the PRL Thaltej campus were part of the event along with the geological samples display and real asteroid samples (meteorites) display.

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Glimpses of Asteroid Day @PRL



