POPULAR SCIENCE LECTURE

On

Advanced X-ray Imaging using Synchrotron Light Sources

Organized by

Indian Women Scientist Association

Vashi, Navi Mumbai

Supported by BRNS - DAE

In Association with

Department of Physics

Rayat Shikshan Sanstha's,

Karmaveer Bhaurao Patil College,

Vashi, Navi Mumbai

DR. YOGESH KASHYAP

Scientific Officer, BARC, Mumbai

Research Interests:

- X-ray
- Diffraction enhanced imaging,
- micro-tomography,
- Laminography
- Neutron based techniques.

He is involved in setting up of laboratory based X-ray, micro CT and X-ray phase contrast imaging facility at BARC, Mumbai. Dr.Yogesh Kashyap has developed various X-ray phase and dark-field imaging techniques which provide complementary and inaccessible information compared to conventional X-ray absorption or visible light imaging. He is also involved in the development of multipurpose imaging beamline at Indus-2, RRCAT, Indore synchrotron source. This is national facility and center to the requirements of advanced imaging techniques like Phase-contrast imaging, diffraction enhanced imaging, micro-tomography, laminography etc.

9th January, 2021 at 3 pm

Session will be held through Google Meet

Registration Link : https://forms.gle/R4c2H6F2o7PmYLFGA

Google Meet Link: https://meet.google.com/txf-hsvp-gcq

Abstract -

X-rays are especially important for investigating the properties of materials. X-rays are able to probe deeply and non-destructively in solid materials, their degree of penetration depending on their energy and on the electron density of the constituent elements that make up the sample under investigation. X-ray photons with energies of several keV have wavelengths comparable to those of typical atomic spacing in solid materials. Under certain conditions, crystalline arrays of atoms can there fore act as interference gratings for X-rays, which can therefore be diffracted.

Since, their discovery in late 1895 by Wilhelm Roentgen, X-rays have played a pivotal role in society, particularly in medicine, pharmacy, physics and chemistry. Whereas research using X-rays was originally the dominion of physicists, X-rays are now a ubiquitous tool for research in almost all branches of scientific endeavors, from determining the internal architecture of cells and other biological structures, to the chemical composition, fabrication techniques and provenance of archaeological artefacts, to insights into the hidden earlier artistic efforts. This broad range of applications of X-rays has in the last two decades expressed itself in the diverse disciplines served and the broad palette of techniques now available at synchrotron facilities, which represent one of the principal examples of multi disciplinary research. Today, there are more than 70 facilities worldwide in operation or under construction, providing services for approximately 100000 users from virtually very discipline of the natural sciences. Synchrotron storage rings are very powerful sources of X-rays. Synchrotrons research facilities are now a days designed and dedicated to generate tunable beams of electromagnetic radiation from the far infrared to the hard x-ray regime with intensities many orders of magnitude greater than those produced by laboratory-based X-ray sources.

This talk will cover the use of synchrotron radiation based X-ray sources for the determination of materials structures and properties in physics, chemistry, biology and related disciplines such as X-ray imaging and materials science.