



**S N BOSE NATIONAL CENTRE  
FOR BASIC SCIENCES**

*Block JD, Sector III, Salt Lake, Kolkata 700 106*

# **DEPARTMENTAL SEMINAR**

# **Astrophysics and Cosmology**

**20<sup>th</sup> January, 2022**

**3.30PM**

**ONLINE**

## **SPEAKER**

**Mr. Ajay Sharma, Junior Research Fellow, SNBNCBS**

## **TITLE OF THE TALK**

**DETECTION OF GAMMA-RAYS IN SPACE  
AND ON GROUND**

## **ABSTRACT**

Gamma rays are neutral photons and also known as cosmic messengers. Earth is continuously bombarded by cosmic rays isotropically, which are mostly protons. Because they are charged particles their paths through space can be deflected by the magnetic fields. Origin of these cosmic rays are not known. Gamma-rays move in a straight line. By observing gamma-rays, we can pinpoint sources of cosmic rays. Cosmic rays follow power law spectrum and similarly gamma-rays also follow similar power law spectrum. At low energy, flux of the gamma-rays is 1 photon/m<sup>2</sup> /sec. We can detect these low energy gamma rays by sending a detector above the atmosphere. But as we move to higher energies, the gamma rays flux decreases rapidly (gamma ray flux at energy 10<sup>15</sup> eV is about 1 photon /m<sup>2</sup>/year). Therefore Space-based detectors are not capable of detecting very high gamma-rays. But on the other hand, ground-based detection techniques provide large detection area and we can detect these gamma-rays indirectly on the ground. When gamma-rays are incident on the earth's atmosphere, a shower is induced by gamma rays through pair production mechanism. All of the above points, I will discuss in first half of the talk. In the second half of the talk, I will discuss Statistical Analysis Methods (Frequentist and Bayesian approach) for results in gamma-ray astronomy.

## **HOST FACULTY**

**Dr. Ramkrishna Das**

**Associate Professor & Seminar Coordinator, Astrophysics & Cosmology**

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