



भारतीय ताराभौतिकी संस्थान  
**INDIAN INSTITUTE OF ASTROPHYSICS**  
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स्नातक अध्ययन मंडल **Board of Graduate Studies.**

## **IIA - CU - PhD (Tech) Public Ph.D viva voce examination**

**Speaker:** Joice Mathew

**Title:** Ultraviolet space instrumentation and studies of astronomical objects.

### सार Abstract

The Ultraviolet (UV) domain plays an important role in studying transient events, the atmosphere of stars and planets, characteristics of the interstellar medium, young stellar populations, physical properties of galaxies and quasars. Despite the fact that a unique perspective may be gained from UV observations, the observational capabilities in UV are severely limited. Significant science can be achieved from small UV payloads, which can be realized in a cost-effective way by launching them on a range of easily accessible space platforms, such as high-altitude balloons, sounding rockets, CubeSats, and piggybacking option on other space missions. This thesis explores the design and development aspects of small-scale UV payloads to be flown on these platforms. The prospects for UV observations from the Moon by flying a UV telescope as a piggyback payload on a lunar landing mission have been explored. We have investigated the scientific outcomes and possible configuration of lunar far UV and near UV telescopes. Due to launch weight constraints, we have opted for the development of a near UV telescope - Lunar Ultraviolet Cosmic Imager (LUCI) -, which is an all-spherical UV telescope with a field of view of  $0.46^\circ \times 0.34^\circ$  and would weigh around 1.2 kg. LUCI will observe at a fixed elevation angle and will perform the survey of the sky in the near ultraviolet (200-320 nm) domain from the lunar surface. LUCI has been assembled, tested and calibrated in a class 1000 clean room at the M.G.K Menon Laboratory for Space Sciences. In this presentation, I will briefly explain the design, assembly and calibration of LUCI payload. I will also discuss the development of a wide-field UV imager (WiFi), which has a 70 mm aperture with a circular field of view of  $10.8^\circ$  for UV sky survey (280-340 nm) and transient detections. Design and development of CubeSat based UV payloads, as well as the instrumentation for high altitude balloon experiments, will be presented.

बुधवार Wednesday, 17 अप्रैल April 2019

Venue: प्रेक्षागृह Auditorium

Time: 11:00

सभी का स्वागत है All are welcome.