



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

Visiting Student's Programme Seminar

Speaker: Mr. Sanjay M V,

(MSc - St. Joseph University)

शीर्षक Title: Characterizing the Martian M2 Ionospheric Layer using MAVEN/ROSE Radio Occultation Observations

सार Abstract

Mars, with 95 % carbon dioxide, shows a distinct feature compared to Earth. The ionosphere is created due to photoionization of CO₂ by the Solar EUV (Extreme ultraviolet radiation). The electron density structure of the Martian ionosphere is similar to that of Earth. There is a peak electron density corresponding with the altitude of peak EUV irradiance absorption near ~130 km (termed as M2 layer). The understanding of the M2 layer is important as these will largely respond to the changing solar radiation and sometimes varying magnetic fields. To study this variation, we have used Radio Occultation profiles from the ROSE (Radio Occultation Science Experiment) instrument on board the MAVEN (Mars Atmosphere and Volatile Evolution) mission. In this work, the obtained electron density profiles are traced for the peak altitude and peak electron densities, and also other ephemeris information. In a total of 1400 profiles, we used the Chapman fit model to extract peak altitude and densities, and we obtained nearly 800 profiles matching the fit and obtained the results. The temporal studies of peak altitude and densities were studied, and there is a good correlation with EUV (20-90nm) measurements measured using the Extreme Ultraviolet Monitor instrument on board MAVEN. The peak densities were higher during the dayside, and altitudes were below 160 km. It was the opposite at night. On the geographical map, higher densities were observed on both hemispheres. The result, implications, and future work will be discussed in the presentation.

सोमवार Monday 23, जून June 2025

Venue: प्रेक्षागृह Auditorium

Time: 11:30 AM

सभी का स्वागत है All are welcome.