



भारतीय खगोलभौतिकी संस्थान
INDIAN INSTITUTE OF ASTROPHYSICS
कोरमंगला Koramangala, बेंगलूरु Bengaluru – 560034.

स्नातक अध्ययन मंडल **Board of Graduate Studies.**

Visiting Student's Programme Seminar

Speaker: Mr. Dheeraj Vittal Shenoy
(MSc Jain University)

शीर्षक Title: Sun-as-a-star Differential Emission Measure Analysis of Coronal Dimmings associated with Coronal Mass Ejections.

सार Abstract

Coronal dimmings on the Sun are temporary reductions in coronal plasma emissions, often linked to coronal mass ejections (CMEs) associated with solar flares or filament eruptions. These dimmings typically persist for a few hours to a few days, characterised by an initial rapid decrease in intensity followed by a gradual recovery. In this study, we perform a differential emission measure (DEM) analysis using a Sun-as-a-star approach to investigate the most prominent temperature-dimming band and mass and velocity of associated CMEs. Using data from the Atmospheric Imaging Assembly (AIA) aboard the Solar Dynamics Observatory (SDO), we analyse seventeen CME-associated events, including fourteen flaring events and three filament eruptions. Our findings reveal that while the temperature band exhibiting the maximum dimming varies between events, significant dimmings are primarily observed within the 5.85–6.45 log K temperature range. In contrast, emissions in higher temperature bands show minimal or no dimming. The DEM-weighted coronal temperature also reveals a noticeable difference between pre-event conditions and the peak dimming phase. Intriguingly, we observe signs of coronal heating during the early stages of the dimming, highlighting the complex thermal dynamics of the corona during CME evolution. Furthermore, we calculate the mass and velocity of the CMEs using an empirical formulae and compare these estimates with values reported in the CME CDAW catalogue. Our Sun-as-a-star analysis uncovers significant discrepancies, particularly in the CME mass estimates, which exhibit the largest deviations. These differences indicate that the empirical formulae, originally developed for close-up CME observations, require modifications for application to the Sun-as-a-star approach. These results offer valuable insights into the coronal response to CMEs, the associated heating of the coronal plasma, and the limitations of current sun-as-a-star modelling methods. They also contribute to a deeper understanding of the solar-stellar connection and hold significant implications for advancing space weather forecasting.

गुरुवार Thursday 21, अगस्त August 2024

Time: 10:00 AM

Venue: प्रेक्षागृह Auditorium

सभी का स्वागत है All are welcome.