



## **SEMINAR**

### **Kinematic Evolution of CMEs in the Heliosphere**

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Coronal Mass Ejections (CMEs) are the potential drivers of many space weather events and the estimation of their arrival time near 1 AU is a crucial problem for a solar-terrestrial physicist. Since the discovery of CMEs, several methods have been developed to estimate their arrival time, mainly using the coronagraphic observations near the sun or using empirical, statistical or numerical MHD models. Before the era of heliospheric imagers, studies were limited to use of only two point observations of CMEs, one near the Sun as remote sensing observations and other near the Earth viz. in situ observations. Such studies are not sufficient for accurate arrival time prediction of CMEs.

In this talk, I will first revisit the physics of appearance of a CME and some inherent difficulties in reliably estimating its kinematics and arrival time. Then, I will show how continuous tracking of CMEs from near the Sun to the Earth and beyond, is possible using J-maps constructed from SECCHI/STEREO images. I will show, in order to understand the propagation of CMEs, we have estimated their kinematics by implementing the geometric triangulation technique. The estimated kinematics is used as input to the drag based model of CME propagation for the distance where CMEs could not be tracked unambiguously. This approach improves the estimation of the arrival time as well as the transit velocity of a CME at 1 AU. In the end, I will emphasize that use of kinematics (even deprojected, i.e. 3D) of CMEs, estimated in coronagraphic field-of-view is often not sufficient for accurately predicting their arrival time near the Earth.

**Date:** Jun 02, 2014

**Time:** 17:00 hrs

**Venue:** USO Seminar Hall