



HAO Colloquium Series

(Refreshments served)

Speaker: Enrico Landi, University of Michigan

Time: 1:30–2:30 pm

Date: Thursday, May 24, 2012

Location: CG1-1210, South Auditorium

Title: Diagnostics of the solar wind using in-situ and spectroscopic observations

Abstract:

In this talk I will describe a new diagnostic technique that simultaneously utilizes two completely different types of observations - in-situ measurements of solar wind charge states, and high-resolution spectroscopy of the inner solar corona--to determine the temperature, density and velocity of the solar wind as a function of height in the inner corona, below the plasma freeze-in point. This technique relies on the ability to calculate the evolution of the ion charge composition as the solar wind escapes the Sun given wind temperature, density and velocity profiles as a function of distance. The resulting charge composition can be used to predict frozen-in charge states as well as spectral line intensities, to be compared with insitu and remote sensing observations.

This diagnostic technique is applied to SOHO/SUMER and Ulysses/SWICS observations of the fast solar wind, in order to test two different models of fast solar wind acceleration: a wave-driven model where the solar wind is expected to originate from the lower chromosphere and a reconnection-driven model where the wind originates in the inner solar corona. We also show that line intensity profiles may significantly depart from those obtained using the common ionization equilibrium assumption even at low altitudes.