MAS17-2017-000191

Abstract for an Invited Paper
for the MAS17 Meeting of
the American Physical Society

Electric Fields on the Sun: How Can We Determine Them and Why Should We Care?

MARIA KAZACHENKO, UC Berkeley

The most violent space weather events, eruptive solar flares and coronal mass ejections, are driven by the release of free magnetic energy stored in the solar corona. Energy can build up on timescales of hours to days, and then may be suddenly released in the form of a magnetic eruption. Can we use the observed evolution of the magnetic fields in the solar photosphere to model the evolution of the overlying coronal field, including the storage and release of magnetic energy in such eruptions? The objective of CGEM, the Coronal Global Evolutionary Model, is to develop and evaluate such a model. The primary innovation of the CGEM, as compared to the majority of current generation of coronal field models that are constrained to match the surface magnetic field, is the ability of CGEM's corona to support electric currents generated inductively by electric fields, thereby allowing for a consistent energy buildup process in the corona. In this talk I will discuss the new electric field inversion technique we use in CGEM and present its recent applications to find energy fluxes in an evolving active region and to drive the time-dependent coronal magnetic field.