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The Incipient Stages of Solar Eruptions

Alphonse Sterling^{1*}

¹NASA/MSFC

Solar eruptions are the starting point of large, transient disturbances to the Heliosphere in the form of Coronal Mass Ejections (CMEs). Understanding the onset of solar eruptions therefore is vital to long-term Space Weather interests. Solar eruptions originate from locations on the Sun where magnetic polarity reverses across magnetic inversion lines. Filaments of cooler chromospheric material suspended in the hot corona frequently demarcate these inversion lines, with the onset of eruption of the filament itself being among the earliest indicators of the start of the overall solar eruption. In recent years we have been investigating the onset of solar eruptions by studying the dynamics of solar filaments just prior to and during eruption. In this talk we briefly review work by us and others on filament eruptions, mainly based on observational data from the SoHO, Yohkoh, TRACE, Hinode, and SDO satellites among other sources.

Keywords: Solar Eruptions, Solar Filaments, Solar Magnetic Fields, Solar Flares, CMEs