

Project Details

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Project Title:

Helicity-driven sigmoid evolution and its role in CME initiation

PI Name: David Alexander

PI Email: atn@g.ucla.edu

Affiliation: Lockheed Martin Solar and Astrophysics Laboratory

Project Member(s):

- Nightingale, Richard W; COI; Lockheed Martin Advanced Techlgy Ctr
- Shine, R A; COI; Lockheed Palo Alto Research Labs
- Metcalf, Tom ; Collaborator; LMSAL

Summary:

Recent observations of rotating sunspots in TRACE white light images and their apparent association with soft X-ray sigmoids have led to the intriguing possibility that observations of sunspot rotation serve to identify the driver for sigmoid formation, evolution and their potential eruption. A number of rotating sunspot events have now been observed, many associated with some of the largest solar flares and CMEs of this solar cycle. We propose to explore the energization of the corona resulting from the observed rotational motions of the sunspots. In particular we will focus on the relationship between the sunspot rotation and the evolution of sigmoid structures with the objective to determine the key physical conditions that govern whether a sigmoid will destabilize and produce a CME. The role of the coronal helicity injection implicit in the sunspot rotation will be explored as the ~proximate cause for the sigmoid evolution. This study will lead to a better understanding of the physics that determines the conditions for sigmoid eruption and, consequently, may lead to a useful forecasting tool for predicting geo-effective events.

Publication References:

Summary: "

Reference: Alexander, David Rice U. - Helicity-driven sigmoid evolution and its role in CME initiation