Abstract Submitted
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Stability and Acceleration of Solar Flux Ropes: Application to Coronal Mass Ejections[1] PETER SCHUCK, JAMES CHEN, Plasma Physics Division, Naval Research Laboratory — The dynamics of solar flux ropes have received much attention in connection with coronal mass ejections (CMEs). A major unanswered question is how initial quasi-equilibrium flux ropes are driven. The Lorentz hoop force, originally derived for toroidal tokamak equilibrium, has been extented to expanding solar flux ropes with stationary footpoints [1]. We discuss the results of extensive comparisons between calculated flux-rope dynamics and recently observed CME dynamics (17 events). The agreement is found to be very good. In particular, the intrinsic spatial and temporal scales produced by the model equations are manifested in observed CME acceleration profiles [2]. More recently, a simplified equation based on the same concept has been proposed to describe CME dynamics [3]. This equation describes a system with no fixed footpoints and yields fundamentally different scales. We discuss how the differences are manifested in observed acceleration and how they can be used as observational discriminators.
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James Schuck
Plasma Physics Division, Naval Research Laboratory

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