

The emergence and evolution of twisted coronal magnetic fields: Comparing models and observations

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We will present new results comparing coronal plasma observations to observables predicted by MHD models of twisted magnetic structures in the corona. We will focus on their emergence through the photosphere, their subsequent equilibrium states, and their eruptive properties. We will show that observations of coronal filaments, before, during, and after eruptions, can be explained. In particular, we will demonstrate that the observed relationship between filament, filament cavity, and hot X-ray sources such as sigmoids are reproduced for a variety of twisted magnetic structures in equilibrium. We will also demonstrate that modeled loss of equilibrium and eruption of such magnetic structures can explain a range of observed behaviors of filaments, their cavities, and X-ray sigmoids during and after eruptions. These include observations of partially-erupting filaments and the immediate reformation of X-ray sigmoids after an eruption.