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Twisted magnetic flux ropes: A breeding ground for CMEs? SARAH GIBSON, NCAR/HAO — The state of coronal magnetic fields prior to a coronal mass ejection (CME) is critical to the physical mechanisms that drive eruptions. It is generally accepted that the energy that drives the CME is magnetic in origin. Sheared coronal fields can store energy which ultimately will be released in the eruption of the CME. We explore the possibility of a specific magnetic pre-CME configuration, that of a magnetic flux rope of field lines that twist about an axial field line. We find the concept of the flux rope both theoretically and observationally compelling. From a theoretical perspective, the flux rope may represent a minimum energy configuration that conserves magnetic helicity, and as such be a common equilibrium state in the corona capable of storing enough magnetic energy to drive a CME. When some helicity or twist threshold is crossed, the equilibrium is lost, and the energy is released in the CME. From an observational point of view, the flux rope model predicts specific coronal observables, for example X-ray sigmoids and white light cavities. Therefore, studying the observed evolution of such quiescent coronal structures prior to the CME gives us crucial insight into the physics of coronal storage and release of energy.

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