Temperature Structure of a Coronal Cavity

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We analyze the temperature structure of a coronal cavity observed in Aug. 2007. Coronal cavities are long, low-density structures located over filament neutral lines and are often seen as dark elliptical features at the solar limb in white light, EUV and X-rays. When these structures erupt they form the cavity portions of CMEs. It is important to establish the temperature structure of cavities in order to understand the thermodynamics of cavities in relation to their three-dimensional magnetic structure.

To analyze the temperature we compare temperature ratios of a series of iron lines observed by the Hinode/EUV Imaging Spectrometer (EIS). We also use those lines to constrain a forward model of the emission from the cavity and streamer. The model assumes a coronal streamer with a tunnel-like cavity with elliptical cross-section and a Gaussian variation of height along the tunnel length. Temperature and density can be varied as a function of altitude both in the cavity and streamer. The general cavity morphology and the cavity and streamer density have already been modeled using data from STEREO's SECCHI/EUVI and Hinode/EIS (Gibson et al 2010 and Schmit & Gibson 2011).