

---

# Magnetism and the Invisible Man: The Mysteries of Coronal Cavities

Sarah Gibson\*<sup>1</sup>

<sup>1</sup>National Center for Atmospheric Research (NCAR) – 3080 Central Green Dr Boulder, CO, 80301  
USA, United States

## Abstract

Magnetism defines the complex and dynamic solar corona. Twists and tangles in coronal magnetic fields build up energy and ultimately erupt, hurling plasma into interplanetary space. These coronal mass ejections (CMEs) are transient riders on the ever-outflowing solar wind, which itself possesses a three-dimensional morphology shaped by the global coronal magnetic field. Coronal magnetism is thus at the heart of any understanding of the origins of space weather at the Earth. However, we have historically been limited by the difficulty of directly measuring the magnetic fields of the corona, and have turned to observations of coronal plasma to trace out magnetic structure. This approach is complicated by the fact that plasma temperatures and densities vary among coronal magnetic structures, so that looking at any one wavelength of light only shows part of the picture. In fact, in some regimes it is the lack of plasma that is a significant indicator of the magnetic field. Such a case is the coronal cavity: a dark, elliptical region in which strong and twisted magnetism dwells. I will elucidate these enigmatic features by presenting observations of coronal cavities in multiple wavelengths and from a variety of observing vantages, including unprecedented coronal magnetic field measurements now being obtained by the Coronal Multichannel Polarimeter (CoMP). These observations demonstrate the presence of twisted magnetic fields within cavities, and also provide clues to how and why cavities ultimately erupt as CMEs.

**Keywords:** prominences, cavities, coronal magnetic field

---

\*Speaker