**ABSTRACT**

The motivation for the study of cavities in the Solar corona is the need to understand magnetic fields in the corona and to find a way to predict Coronal Mass Ejections. Thanks to the Stereo mission we now have a capability to look at the Solar corona from different angles, which gives us a chance to reconstruct three-dimensional structures on the Sun. The objective of the research is to use images from stereo to model a solar prominence cavity, and based on that model to make inferences about its visibility and evolution in time.

**STEREO**

The Solar TERRrestrial RELations Observatory (STEREO) is a NASA mission launched in 2006 and still active. STEREO consists of two satellites STEREO A and STEREO B, which both stay in orbits similar to Earth’s orbit, but they are increasingly farther apart, and they are at different latitudes with respect to Solar equator. The main goal of the mission is to investigate CMEs and their influence on the planet. The instruments on both spacecrafts are SECCHI, IMPACT, PLASTIC, and SWAVES.

**DATA**

The analysis used mostly 195 Å images from Extreme UltraViolet Instrument (EUVI), which is a part of SECCHI. In the August 2007 Cavity survey it uses one image from each STEREO per three hours, and in the long term one image per day. The model images come from CavModel.

**CAVMODEL**

CavModel is a code that models density of the solar corona. To make a model of a cavity it creates a radially symmetric background, and puts a Gaussian shaped streamer with a depleted region of an elliptical cross-section embedded in it. The model has a capability of creating cavities of different heights, widths and lengths, as well as an arbitrary depletion profile. Additionally CavModel can create an image from any position by integrating the density along the lines of sight from that position.

**CAVITIES**

The cavities are depleted regions in Solar corona of elliptical cross-section. They form above Solar prominences, and are directly connected to the magnetic field of the prominence, which makes them very important in study of magnetic fields inside the corona. Cavities can be seen in many wavelengths. In white light you can see them as a product of Thompson scattering of photons from photosphere, and in EUVI you can see them by thermal emissions from the corona itself.

**CAVFINDER**

CavityFinder is an IDL code designed to identify and measure cavities. It basically prepares the raw data from STEREO, reads the position of the spacecraft, looks for cavities, and measures many of its properties, such as height, width depletion as a function of height, position on the limb, sharpness of edges, and the total area. Also it converts some of the raw data into a more useful form, and makes useful plots.

**THE AUGUST 2007 CAVITY**

The August 2007 Cavity has been chosen as a model cavity since it has already been thoroughly measured and investigated from the Earth, and because it is clear and does not show any unusual features. Based on the images from STEREO it is possible to use Cavmodel.pro to recreate an actual 3-D model of this cavity. The only problem is that in 2007 the spacecrafts were relatively close together and the differences caused by different viewing angle are not strikingly apparent.

**THE NEXT STEP**

As the next step it is probably worthwhile to look at and model some cavities from later stages of STEREO mission when their time evolution is more apparent, and when the viewing angle effects play a larger role. It might be worthwhile to extend the long time survey to look at cavities in another stages of the solar cycle or only at times when STEREO spacecrafts are far apart. The CavityFinder needs to improve its filters and running time.