[S06-3] Evolution of a Very Large Filament : Its Formation to Eruption

문용재, 조경석, 김연한, 봉수찬, 박영득
한국천문연구원

In this paper, we present the detailed evolution of a well-observed large filament for about 45 days from its formation to eruption using daily H-alpha images at BBSO. It firstly appeared as a faint and sheared filament near the east limb on 2002 June 10. It became a large filament on June 16 with a longitudinal extension of about 90 degree. It rotated off the disk on June 26 and then re-appeared again on July 6 over the east limb. At that time, it had several leg-like structures which later look like barbs when they were against the solar disk. On 2002 July 16, it became a well developed mid-latitude filament with a large longitudinal extension of 130 degree. By tracing longitudinal shift of filament features, we estimated solar rotation rates as a function of latitude from the equator to N50 degrees. Its first eruption on July 18 was associated with a SOHO/LASCO CME as well as a strong X1.8 flare in a nearby active region AR 0030. BBSO daily H-alpha movies show that there were slow rising motions for a couple of days before the first eruption, which is evidently supported by the fact that the rotation rates of filament features were significantly deviated from the normal solar differential rotation rate. It is also found that there were very complex internal motions for several days after the first eruption. By examining the SOHO/EIT and SOHO/LASCO images, we found that there were four eruptions after these internal motions from July 22 to July 25.

[S06-4] Magnetic Twist of EUV Coronal Loops Observed by TRACE

RyunYoung Kwon, Jongchul Chae
Astronomy Program, School of Earth and Enviromental Science
Seoul National University

Coronal loops are thin and curved structures of hot plasma tracing magnetic field line and emitting intense radiation in the corona. We estimate the magnetic twist of coronal loops that can explain the constriction of plasma into a loop without dispersion. We assume that the segment of a coronal loop taken by TRACE 171Å image is a part of a straight, non-force-free twisted flux tube and that the variation of the axial field strength along the tube is determined by the large scale three-dimensional configuration of the coronal magnetic field calculated by linear force-free extrapolation of photospheric magnetic field observed by SOHO/MDI.
We selected a number of conspicuous loops which are bright enough and well separated from other adjacent loops on TRACE EUV images so that we can fit a magnetic field line to each loop from one footpoint to the other footpoint. We have applied our method to several coronal loops and found that these loops have twist values from 1.5π to 2.5π, which suggest that the winding number of EUV coronal loop may be around one.