[CS05] Kinematic comparisons of XPE, CME, and type II radio burst

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We have made kinematic comparisons of X-ray plasma ejection(XPE), CME, type II solar radio burst on 1999 October 26. First, an XPE was observed from 21:12 UT to 21:23 UT in the Yohkoh/SXT field of view (1.1 to 1.4 solar radii). The XPE was initially accelerated and then constantly propagated with a speed of about 350 km/s. Second, the associated CME was observed by the Mauna Loa Mk 4 coronameter (1.2 to 2.8 solar radii). Since the CME erupted from a pre-existed helmet-streamer, we can identify three part structures of the CME. The CME front was clearly identified at 21:21 UT and propagated with an average speed of about 450 km/s. The CME core first appeared at 21:16 UT and its speed is 100 km/s (around 1.6 solar radii) at the type II starting time(21:30 UT). Third, a type II solar radio burst was observed at 21:30 UT by the Culgoora solar radio spectrograph. The burst started at the height of 1.5 Rs and the propagation speed is estimated to be about 400 km/s. By comparing these three phenomena, we found that (1) there is a remarkable difference (0.4 solar radius) between the CME front and the XPE front at 21:23 UT, (2) the XPE front is co-spatial with the CME core, (3) the type II formation height is consistent with the CME core and the trajectory extrapolated from the XPE front. Regarding the type II shock origin, our results suggest two possibilities from the kinematical point of view: the XPE front and the CME flank.

[CS06] Flux rope formation by Small-scale Magnetic Reconnections in The Pre-Flare Phase of A M1.2 Flare

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We examine the pre-flare activity of a M1.2 flare that occurred in NOAA Active Region 8440 on January 16, 2006 using Yohkoh/SXT, 1600ÅUV images by TRACE, X-ray of GOES satellite, and BBSO/magnetograms. We note a weak GOES flux enhancement that occurred just four minutes before the starting time of the major flare. This enhancement is located at one footpoint of x-ray loops in SXT and the major flare occur at the kernel of this footpoint. Before pre-flare brightening, TRACE UV image show that there are S-shape sigmoid loops on SXT brightening point and these loops lay on the polarity inversion line in BBSO/magnetogram. Time series of UV images show several pieces of evidence for small-scale magnetic reconnection. There were several interactions among small UV loops, birghteing patches, and the change of UV loop connectivity. As a result, large-sized rising loops were formed. The overall structure and morphological change of UV loops is quite similar to the reconnection picture of Van Ballegooijen & Martens (1989). In particular, a series of UV images show that a flux rope structure seems to be formed by reconnection process as they predicted. Our results imply that the pre-flare activity of the M1.2 flare be composed of small-scale reconnections and play an important role in triggering the flare.