[초SE-07] Moreton Wave and EUV Wave Associated with the 2010 February 7 and 2010 August 18 Flares

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Solar flares are very spectacular, and are associated with various phenomena. Coronal shocks or disturbances are one of such flare-related phenomena. Although Moreton waves and X-ray waves are well explained with MHD first mode shocks propagating in the corona, there still remains a big problem on the nature of the waves, since they are very rare phenomena. On the other hand, EIT waves (or EUV waves) have been paid attention to as another phenomenon of coronal disturbances. However, the physical features (velocity, opening angle, and so on) are much different from those for Moreton waves and X-ray waves.

We report detailed features of the coronal disturbances associated with the 2010 February 7 and the 2010 August 18 flares. For the former flare we analyzed the H-alpha images obtained by SMART at Hida Observatory, Kyoto University, Japan and by a flare telescope at National Astronomical Observatory of Japan, the X-rays images taken by Hinode/XRT, and the EUV images obtained by the both satellites of STEREO, and found the Moreton wave, X-ray wave, and EIT wave, simultaneously. In the latter flare, on the other hand, we observed a very fast EUV wave in EUV images taken by SDO/AIA. The propagating speed is comparable to the MHD first mode wave, while there is no obvious evidence of shocks for this flare. From these results, we discuss the nature of coronal disturbances.

[구SE-08] Formation of quadrupolar-like structure via flux emergence on the Sun

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The emergence of a magnetic flux tube (flux emergence) is a process of transporting magnetic field from the solar interior to the atmosphere. This process naturally produces bipolar structure at the surface, in which emerging field lines simply connect opposite polarities, while observations suggest that the surface distribution of magnetic field is more complicated than a simple bipole. This study is aimed at solving this apparent mismatch between the model and observations, showing how the surface distribution changes from a simple bipolar distribution to a quadrupolar-like one, where a half-turn rotation of the polarity inversion line plays an important role. We explain the physical reason of this half-turn rotation and also discuss a possible configuration of filament magnetic field in terms of the quadrupolar-like structure formed via flux emergence.