[구SE-03] A HIGH FREQUENCY TYPE II SOLAR RADIO BURST ASSOCIATED WITH THE 2011 FEBRUARY 13 CORONAL MASS EJECTION

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We examine the relationship between a type II radio burst that started from an unusually high frequency of 425 MHz (fundamental component) and an associated white-light coronal mass ejection on 2011 February 13. The radio burst had a drift rate of 2.5 MHz/sec, indicating a relatively high shock speed. From SDO AIA observations we find that a loop-like erupting front sweeps across high density coronal loops near the start time of the burst (17:34:15 UT). We find fragmented structures of the type II burst, which indicates the signature of the shock propagating through the multiple loops. The deduced distance of shock formation (0.06 Rs) from flare center and speed of the shock (1100 km s^{-1}) using the measured density from AIA/SDO observations are comparable to the height (0.05 Rs, from the solar surface) and speed (700 km s^{-1}) of the CME leading edge observed by STEREO/EUVI. We conclude that the type II burst could be onset even in the low corona (41 Mm or 0.06 Rs, above the solar surface) if a fast CME shock passes through the high density loops.

[구SE-04] Observation of an Ellerman bomb and its associated surge with the 1.6 meter New Solar Telescope at Big Bear Solar Observatory

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We observed an Ellerman bomb(EB) and its associated surge using the Fast Imaging Solar Spectrograph(FISS) and the broadband TiO filter of the 1.6 meter New Solar Telescope at Big Bear Solar Observatory. As is well-known, the EB appears as a feature that is very bright at the far wings of the H alpha line. The lambdameter method applied to these wings indicates that the EB is blue-shifted up to 6km/s in velocity. In the photospheric level below the EB, we see rapidly growing “granule-like” feature. The transverse velocity of the dark lane at the edge of the “granule” increased with time as reached a peak of 6km/s, at the time of the EB’s occurrence. The surge was seen in absorption and varied rapidly both in the H alpha and the Ca II 8542 line. It originated from the Ellerman bomb, and was impulsively accelerated to 20km/s toward us(blueshift). Then the velocity of the surge gradually changed from blueshift of 20km/s to redshift of 40km/s. By adopting the cloud model, we estimated the temperature of the surge material at about 27000K and the non-thermal velocity at about 10km/s. Our results shed light on the conventional idea that an EB results from the magnetic reconnection of an emerging flux tube and pre-existing field line.