[CS07] Low Coronal Observations of Solar Eruptions

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We have made low coronal observations of solar eruptions (CME, flare, and prominence) using MK4 coronagraph and H-alpha images obtained from Mauna Loa Solar Observatory (MLSO). These data make it possible to examine initial kinematics of CMEs and prominences with a fine temporal resolution of 3 minutes, which is an unique advantage that can not be made by SOHO/LASCO space observations. We have analyzed 71 CMEs (1999-2005) whose front is clear enough to measure. From this analysis, we obtained their basic information such as CME height-time, CME position angle, prominence time, flare strength, and flare starting time. Main results can be summarized as follows. 1) The CME speed ranges from 150 to 1500 km/s and its mean value is about 520 km/s. 2) About 46% (31/68) CMEs are associated with prominences. 3) About 70% (49/71) CMEs are associated with flares (X-9, M-14,,C-20, B-6). 4) Most of CMEs and flares occurred at the nearly same time; that is, about 83% (36/43) events are within 30 minutes. 5) There is a noticeable correlation (r=0.64) between CME speed and flare X-ray strength. 6) About 40% (27/71) CMEs have oscillating speed patterns. Their amplitude is about 200 km/s and their period is about ten minutes. We are examining several interesting subjects such as the initiation of solar eruptions and the CME speed oscillation.

[CS08] Shock Developement from Sub-Alfvénic, Magnetosonic Waves Triggered by CMEs

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Type II radio bursts are important tracers for shock waves propagating in the corona or away from the Sun (Wild & McCready 1950). Metric type II bursts are thought to be generated in the low corona (1.2-2.5 R⊙), and deca-hecto-kilometric type II bursts in the interplanetary space. Evidences for the association of these bursts with coronal mass ejections (CMEs) are growing (Cliver, Webb & Howard 1999; Cho et al. 2003). As a possible mechanism for a shock wave induced by a relatively mild CME, we propose the steepening of a sub-Alfvénic, nonlinear magnetosonic wave. This mechanism can naturally explain radio bursts at low altitudes and/or those with low propagation speeds.