[SO-01] A Spectroscopic Study of Two Coronal Mass Ejections: 3D Structure and Energy Balance

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Three-dimensional reconstructions of the 2002 April 21 and 2001 December 13 partial Halo Coronal Mass Ejections(CMEs) have been made based on the ultraviolet (UV) lines observed by the Ultraviolet Coronagraph Spectrometer (UVCS). We also investigate the heating and energy balance of the ejected CME plasma for the December 13 2001 CME.

For the April 21 2002 CME, UVCS observed the O VI line profiles split into strongly red- and blue-Doppler shifted components, and the region of the split profiles grew rapidly along the length of the spectrograph slit. The more localized [Fe XVIII] bright emission starts at the same time as the maximum red Doppler shift of O VI, indicating that it is inside the CME.

For the December 13 2001 CME, UVCS observed Doppler shifted material of a partial Halo CME on December 13 2001. The observed ratio of the [O V]/O V] is an interesting feature that represents a reliable density diagnostic. Earlier UVCS observations of CME by Akmal et al. (2001) and Ciaravella et al. (2001) found evidence that the ejected plasma is heated long after the eruption. We have investigated the heating rates, which represent a significant fraction of the CME energy budget.

[SO-02] Periodic and Abrupt Flux Changes of the Cosmic Rays Interacting with the Solar Wind

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Cosmic rays are mostly particles of ionized atoms originated at the diverse astronomical objects. Galactic cosmic rays (GCRs) entering the heliosphere from the interstellar medium encounter the supersonic outward solar wind carrying the interplanetary magnetic field (IMF) and propagate upstream against the solar wind. The flux of GCR in energy range of 0.3~20 GeV observed by the neutron monitors on the surface of the earth is affected by the variations of the solar wind speed and IMF. If the modulation is accounted for, the galactic processes like acceleration and propagation of cosmic rays will be fully understood. Therefore, this modulation process is important to understand.

The GCR intensity observed by the neutron monitors is assumed to be isotropic but it shows diverse variations. Some of variations are sinusoidal with periods of the Earth's rotation, the Sun's rotation and the solar activity cycle and the others are transient events such as Forbush Decrease (FD) or Ground Level Enhancement (GLE). Such variations might be caused by the changes of heliospheric structure initiated by the activities on the solar surface and intermediated by the solar wind.

For the statistical study on effects of the solar wind and the IMF on the GCR intensity variation, we examined the anisotropy of diurnal variation and the temporal and spatial characteristics of FD events as the representative periodic and abrupt variation of cosmic ray intensity.