

Coronal Mass Ejections near the Sun and in the Interplanetary Medium

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Coronal mass ejections (CMEs) are the most energetic phenomenon in the heliosphere. During solar eruptions, the released energy flows out from the Sun in the form of magnetized plasma and electromagnetic radiation. The electromagnetic radiation suddenly increases the ionization content of the ionosphere, thus impacting communication and navigation systems. The plasma clouds can drive shocks that accelerate charged particles to very high energies in the interplanetary space, which pose radiation hazard to astronauts and space systems. The plasma clouds also arrive at Earth in about two days and impact Earth's magnetosphere, producing geomagnetic storms. The magnetic storms result in a number of effects including induced currents that can disrupt power grids, railroads, and underground pipelines. This lecture presents an overview of the origin, propagation, and geospace consequences of CMEs and their interplanetary counterparts.