



Interplanetary Propagation of Coronal Mass Ejections and Shocks and Their Effects on Earth

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Magnetic ejecta associated with coronal mass ejections (CMEs) are often preceded by dense sheaths and, when their speed is significantly faster than that of the solar wind, by fast-mode shocks. The propagation of CMEs in the inner heliosphere can now be routinely imaged by heliospheric imagers onboard STEREO. This has helped advance our understanding of the deceleration and interaction of CMEs on their way to Earth. Whereas the propagation between the upper corona and Earth of a fast, isolated CME is relatively well understood, we focus here on more complex cases, where the combination of remote observations and in-situ measurements can further shed light on unusual properties and characteristics. We specifically discuss instances of: 1) slow CMEs driving shocks and their effects on Earth's magnetosphere, 2) shocks measured at 1 AU as propagating inside a previous CME and their geo-effects, and 3) measurements of the same CME by multiple spacecraft in conjunction between the Sun and the Earth.