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Kinematics of coronal mass ejections and auroral science

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An accurate understanding of the propagation of coronal mass ejections (CMEs) is crucial in the prediction of space weather. CMEs generate geomagnetic storms causing catastrophic damages to power grids on Earth and are a serious radiation threat to satellites on low-Earth orbit and their crew during spacewalks. Basic parameters such as their velocity and acceleration varying with time and heliospheric distance away from the Sun gives researchers the opportunity to predict their arrival time in the vicinity of the Earth. Once these clouds of charged particles reach the Earth, aurorae or Northern/Southern lights are generated at higher latitudes. Extreme geomagnetic storms (kp>4) are a matter of concern and also contribute to a beautiful sight with intense auroras. Ground based riometers have proven to be an efficient way to detect these KeV electron precipitation in the ionosphere during auroral formation. Absorption profiles offer a good approach towards studying various associated parameters and eventually help in building a model for predicting these events.

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