



Ion dynamics at a non-stationary shock: MMS observations

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Collisionless shocks act to slow down and thermalize plasma. In astrophysical plasmas, shocks are very efficient particle accelerators and are likely the source of high-energy cosmic rays. Non-stationarity in shocks can have an impact on particle heating and acceleration processes.

High time-resolution measurements from the four closely-spaced Magnetospheric Multiscale (MMS) spacecraft allows us to resolve processes at the Earth's bow shock at sub-gyroscales. We use data from particle and field instruments to, in detail, describe the ion dynamics in one crossing of a non-stationary shock. We characterize the type of non-stationarity and determine its role in ion kinetics and ion acceleration.