



## **Shock non-stationarity observed by MMS**

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Shock waves are ubiquitous in the universe and act to slow down and heat supersonic flows. In collisionless space plasmas, shocks are able to accelerate particles to very high energy through various processes. Many processes relating to shock non-stationarity and plasma dynamics are sub-gyroscale and have therefore previously been difficult to study. The Magnetospheric MultiScale (MMS) mission provides a unique view of Earth's bow shock. With the close spacecraft separation of 7-40km, and high-cadence particle and field measurement, MMS enables studies of the dynamics of plasma and structure of the shock at small spatial and temporal scales. We present recent results from MMS relating to shock non-stationarity. In particular, we discuss observations that reveal motion of the shock surface back and forth across the spacecraft due to ripples moving along the shock front. We compare different shock-crossings by MMS and test models of shock non-stationarity.