

Observations of strong plasma enhancement at the dawn terminator by the MMS

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At the dawn terminator (~ 6 am MLT) the four MMS spacecraft detected several significant plasma enhancements accompanied by strong plasma acceleration. The strongest event was captured by MMS in burst mode (30 ms for electron and 150 ms for ions). The number density abruptly increased from typical magnetospheric background values, $\sim 1 \text{ cm}^{-3}$, up to 50-60 cm^{-3} . The solar wind parameters corresponding to these observations are quite stable without any sharp changes, therefore there is no apparent solar wind driver that is responsible for these injections. The estimated distance from the nominal magnetopause to the spacecraft was $\sim 3 R_E$ and the data does not show characteristics of multiple magnetopause crossings. We combine the MMS observations with results of global MHD simulations to understand which one of several possible scenarios might explain MMS observations: either set of the Flux Transfer Events (FTE) resulting from the dayside reconnection or earthward-propagating dipolarization fronts caused by the tail reconnection.

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