
Effects on comet plasma structure of the heliospheric current sheet crossing

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A disconnection event (DE) of comet plasma tail has remained an unsolved problem in planetary astronomy and space physics. The solar wind is thought to play a major role in the creation of comet plasma tail DEs. In order to present a mechanism that explains the DE in terms of the local solar wind conditions at the comet, a three-dimensional resistive compressible magnetohydrodynamic simulation was carried out to test the effects of the heliospheric current sheet (HCS) crossing on the comet plasma tail dynamics. The results show that frontside magnetic reconnection between the reversed interplanetary magnetic fields can reproduce the evolution morphology of a DE, including ray formation, when a comet crosses the HCS. This supports the association of DEs with HCS crossings.