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SESSION TITLE: SM11D. Plasma Jet Fronts and Particle Acceleration in the Near-Earth Magnetotail I

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ABSTRACT BODY: We present Cluster observations of a series of dipolarization fronts (DF 1 to 6) at the central current sheet in Earth's magnetotail.

The velocities of fast earthward flow following behind each DF 1-3, are comparable to the Alfvén velocity, indicating that the flow bursts might have been generated by bursty reconnection that occurred tailward of the spacecraft. Based on multi-spacecraft timing analysis, DF normals are found to propagate mainly earthward at 160-335 km/s with a thickness of 900-1500 km, which corresponds to the ion inertial length or gyroradius scale.

Each DF is followed by significant fluctuations in the B_x and B_y components of the magnetic field whose peaks are found 1-2 minutes after the DF passage. These (B_x, B_y) -fluctuations propagate dawnward (mainly) and earthward. Strongly enhanced field-aligned beams are observed coincidently with (B_x, B_y) fluctuations, while an enhancement of cross-tail currents is associated with the DFs. From the observed pressure imbalance and flux-tube entropy changes between the two regions separated by the DF, we speculate that interchange instability destabilizes the DFs and causes the deformation of the mid-tail magnetic topology. This process generates significant field-aligned currents, and might power the auroral brightening in the ionosphere. However, this event is neither associated with the main substorm auroral breakup nor the poleward expansion, which might indicate that the observed multiple DFs have been dissipated before they reach the inner plasma sheet boundary.

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