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In situ observations of suprathermal ion acceleration in the near-Earth jet braking region

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Plasma jet fronts and braking regions are sites of substantial particle acceleration in planetary magnetospheres and are considered to play a major role in other distant environments such as the solar corona and astrophysical jets. Jet fronts are the boundaries separating ambient from jetting plasma (e.g. due to reconnection) while jet braking regions is where jets are eventually stopped/diverted. A number of recent in situ observations in the Earth's magnetotail have allowed studying in detail electron acceleration mechanisms at jet fronts/braking region therein. Yet, observations of suprathermal ion acceleration are scarce. Here we show Cluster spacecraft observations of suprathermal ions up to $\sim$ 1 MeV (about 10 times the thermal energy) in the near-Earth jet braking region. Observations indicate that ions are trapped between large-scale oppositely-directed jets and accelerated therein by strong electric fields.