Oberservation of high frequency waves at dipolarization fronts

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For the first time, we observe high-frequency broadband electrostatic waves at the magnetotail dipolarization front (DF). These waves, having frequencies extending from the electron cyclotron frequency, \( f_{ce} \), up to the electron plasma frequency, \( f_{pe} \), contribute \( \sim 10\% \) to the total energy dissipation at the DF. The generation of these waves may be attributed to electron beams, which are observed at the DF as well.