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Heavy ion acceleration at jet fronts

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Transient reconnection events in planetary magnetotails give rise to fast plasma jets, whose leading edges are called dipolarization fronts.
We perform a test particle simulation of the acceleration of several ion species (H+, He+, and O+) in a 2-D model of dipolarization fronts [Greco et al., JGR, 2014].
We study the dependence of the acceleration on parameters of the model, finding, e.g., that the average ion energy increases with the front velocity and with the initial injection energy. Further, our results suggest that ion energization at local dipolarization fronts strongly depends on the initial particle gyroradius and that the energy gained by the most energetic fraction of particles scales approximately as the square root of the mass ratio.