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The Effect of Mass Ratio in Relativistic, Collisionless Electron-Ion Reconnection[1] GREGORY WERNER, CIPS, University of Colorado, MITCHELL BEGELMAN, JILA, University of Colorado and NIST, BENOIT CERUTTI, CIPS, University of Colorado, KRZYSZTOF NALEWAJKO, JILA, University of Colorado and NIST, DMITRI UZDENSKY, CIPS, University of Colorado
— Astrophysical relativistic magnetic reconnection can accelerate particles to high energies, yielding synchrotron and inverse Compton radiation. Thus relativistic reconnection could explain gamma rays and hard x-rays observed from such diverse sources as Pulsar Wind Nebulae, Gamma Ray Bursts, jets of Active Galactic Nuclei, and accretion disc coronas. Using 2D particle-in-cell simulations, we have obtained new results of the effect of the ion/electron mass ratio on relativistic reconnection. We focus on the regime where electrons are strongly relativistic, and ions are mildly relativistic. As ions become increasingly relativistic, the effect of the rest mass ratio diminishes. We scan a range of mass ratios to determine scalings that can be extrapolated to high mass ratios; in particular, we report on the reconnection rate, the energy fractions given to ions and electrons, and the importance of the Hall effect in the generalized Ohm's law.

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