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Effects of Synchrotron Cooling on Relativistic Magnetic Reconnection[1] JAKE FISH, GREGORY WERNER, DMITRI UZDENSKY, Univ of Colorado - Boulder — Magnetic reconnection studies have traditionally focused on plasmas for which radiative processes are dynamically unimportant. However, astrophysical phenomena can create conditions such that radiative cooling can become important over the timescale of reconnection. In particular, synchrotron radiation should play an important role in the strongly magnetized, highly relativistic pair plasmas found in the magnetospheres of gamma-ray pulsars. We study the effects of radiative cooling on reconnection using the particle-in-cell code Zeltron that includes, self-consistently, the synchrotron radiation reaction force. Basic plasma parameters, such as the average particle energy and density at magnetic X-points in the reconnection layer, are measured as functions of radiative cooling strength. We also examine the resulting global particle energy distribution and the emitted synchrotron radiation spectrum. These results allow us to assess reconnection as a possible mechanism powering the pulsed high-energy gamma-ray emission observed in pulsar magnetospheres.

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