The tearing instability in relativistic magnetohydrodynamics

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Magnetic energy dissipation in relativistic plasmas is a crucial process operating in many environments typical of high-energy astrophysics, such as pulsar winds and nebulae, magnetars, and magnetized disks around black holes. In many cases such dissipation is required to be of explosive type, given that flaring activity is often observed in such objects, in the form of sudden releases of gamma rays. Here we discuss the role of the aspect ratio of the reconnecting current sheet, which, as for classic and Hall magnetohydrodynamics (MHD), when sufficiently small is known to lead to a very rapid evolution of the spontaneous tearing instability and to explosive secondary reconnection events (*super-tearing* or *plasmoid instability*). Multi-dimensional simulations of resistive, relativistic MHD are presented for various magnetizations and plasma betas, and 2-D results show a quasi-universal evolution, occurring on the *ideal* (relativistic) Alfvén time. Extension to the 3-D case and possible applications to the physics of magnetars and pulsar wind nebulae are briefly discussed.