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Kinetic simulations of relativistic harmonic magnetic equilibria

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We will present the results of kinetic particle-in-cell numerical simulations of relativistic harmonic magnetic equilibria, so called “ABC fields”. These equilibria have been recently shown by relativistic magnetofluid simulations to be generally unstable. An ideal plasma instability leads to the formation of dynamical current layers where magnetic energy is dissipated via reconnection and particles are accelerated efficiently. This concept may provide a viable generic scenario for the production of rapid gamma-ray and X-ray flares in strongly magnetized astrophysical environments, such as relativistic jets of active galaxies, gamma-ray bursts, pulsar wind nebulae (Crab), or the Galactic Center source Sgr A*.

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