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Relativistic Reconnection

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In the most powerful astrophysical sources, reconnection and turbulence operate in the "relativistic"regime, where the magnetic field energy exceeds even the rest mass energy of the plasma. Here, reconnection and turbulence can lead to fast dissipation rates and efficient particle acceleration, thus being prime candidates for powering the observed fast and bright flares of high-energy non-thermal emission. With fully-kinetic particle-in-cell (PIC) simulations and analytical theory, we investigate the physics of relativistic reconnection and turbulence, and demonstrate that they can be the "engines"behind: (1) high-energy flares in blazar jets; and (2) the hard-state spectra of black hole X-ray binaries and Active Galactic Nuclei.

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