6th Asia-Pacific Conference on Plasma Physics, 9-14 Oct, 2022, Remote e-conference

# The physics of particle acceleration in relativistic reconnection and turbulence

Lorenzo Sironi[1]
[1] Department of Astronomy, Columbia University
e-mail (speaker): lsironi@astro.columbia.edu

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, they can lead to fast dissipation 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 three fundamental aspects of the physics of particle acceleration in relativistic reconnection and turbulence: (1) the injection from thermal energies up to relativistic energies; (2) the physics of power-law formation; (3) the constraints on maximum energy. This work is supported by the Cottrell Scholars Award, NASA 80NSSC20K1556, NSF PHY-1903412, DoE DE-SC0021254 and NSF AST-2108201.