Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Plasma Dynamics and Particle Acceleration in Relativistic Turbulent Magnetic Reconnection FAN GUO, HUI LI, WILLIAM DAUGHTON, XIAOCAN LI, PATRICK KILIAN, Los Alamos National Laboratory — Past years have seen an active development on relativistic magnetic reconnection. A major uncertainty of the reconnection studies is the role of three-dimensional physics and turbulence. This study is designed to explore these aspects when magnetic reconnection occurs in a turbulent state. These large scale three-dimensional fully kinetic simulations are carried out using the LANL's VPIC code on the Trinity machine. Different from typical kinetic studies, we have added a new set of long-wavelength perturbation to drive external turbulence in the simulation domain. Because of this, the reconnection layer quickly evolves into a turbulent state. The flux ropes evolve quickly after their generation, and can completely disrupt due to the secondary kink instability. We find that the while the reconnection is strongly modified by the injected fluctuations and self-generated fluctuation due to secondary tearing and kink instabilities, the acceleration of high particles is robust and not dependent on the injected turbulence. In addition, we show that for the anti-parallel reconnection case the Fermi-like mechanism is still the dominant acceleration process.

Fan Guo
Los Alamos National Laboratory

Date submitted: 03 Jul 2019

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