DPP19-2019-001174

Abstract for an Invited Paper
for the DPP19 Meeting of
the American Physical Society

Determining the Dominant Acceleration Mechanism during Relativistic Magnetic Reconnection in Large-scale Systems[1]

FAN GUO, Los Alamos National Laboratory

While a growing body of research indicates that relativistic magnetic reconnection is a prodigious source of particle acceleration in high-energy astrophysical systems, the dominant acceleration mechanism remains controversial. Using a combination of fully kinetic simulations and theoretical analysis, we demonstrate that Fermi-type acceleration within the large-scale motional electric fields dominates over direct acceleration from non-ideal electric fields within small-scale diffusion regions. This result has profound implications for modeling particle acceleration in large-scale astrophysical problems, since it opens up the possibility of modeling the energetic spectra without resolving microscopic diffusion regions.

[1]We are grateful for support from DOE through the LDRD program at LANL and DoE/OFES support to LANL, and NASA ATP program through grant NNH17AE68I.