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Magnetic Reconnection during Turbulence: Statistics of X-Lines and Heating COLBY HAGGERTY, MICHAEL SHAY, TULASI PARASHAR, WILLIAM MATTHAEUS, YAN YANG, University of Delaware, MINPING WAN, South University of Science and Technology of China, SERGIO SERVIDIO, Universit della Calabria, PIN WU, Queens University — Magnetic reconnection is a ubiquitous plasma phenomenon that has been observed in turbulent plasma systems. It is an important part of the turbulent dynamics and heating of space, laboratory and astrophysical plasmas. Recent simulation and observational studies have detailed how magnetic reconnection heats plasma and this work has developed to the point where it can be applied to larger and more complex plasma systems. We examine the statistics of magnetic reconnection in fully kinetic PIC simulations to quantify the role of magnetic reconnection on energy dissipation and plasma heating. We examine the distribution of reconnection rates at the x-points found in the simulation and find that their distribution is broader than the MHD counterpart, and the average value is approximately 0.1. Reconnection heating predictions are applied to the regions surrounding the identified x-points and this is used to study the role of magnetic reconnection in turbulent heating of plasma. The ratio of ion to electron heating rates is found to be consistent with magnetic reconnection predictions.

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