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Diagnosing Energy Dissipation in Fully Kinetic Continuum Vlasov-Maxwell Plasmas[1] JASON TENBARGE, Princeton University, JAMES JUNO, University of Maryland, GREGORY HOWES, University of Iowa, KRISTOPHER KLEIN, University of Arizona, AMMAR HAKIM, Princeton Plasma Physics Laboratory — We present a novel algorithm for the direct discretization of the Vlasov-Maxwell system using the Gkeyll simulation framework that employs high order discontinuous Galerkin finite elements on an up to 3D-3V phase space grid, including the implementation of a Dougherty collision operator. We leverage the pristine phase space representation made possible by direct discretization to examine energy dissipation in a variety of systems relevant to space and astrophysical plasmas. Specifically, we employ the field-particle correlation technique in phase space to directly diagnose the exchange of energy between fields and particles. We present results from a variety of simple systems, including magnetic pumping and resonant wave damping, and we also apply the field-particle correlation technique to 2D-3V Vlasov-Maxwell simulations of reconnection and turbulence.

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