Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

**Hybrid-Kinetic Simulations of the Collisionless Turbulent Dynamo.** D. A. ST-ONGE, M. W. KUNZ, Princeton University — Dynamically important magnetic fields are ubiquitous in many astrophysical plasmas. Their existence is generally assumed to be a result of the turbulent dynamo, by which a shearing velocity field amplifies a magnetic field to near-equipartition energies. While the collisional dynamo is well understood within the framework of magnetohydrodynamics, the collisionless regime is complicated by pressure anisotropies generated adiabatically by changes in magnetic-field strength. In high-beta plasmas, these anisotropies almost immediately trigger instabilities at the (ion) Larmor scales (e.g. firehose and mirror). These microscale instabilities feed back on the macroscale magnetic field, affecting its growth, structure, and saturation in completely unknown ways. To address this problem, we perform high-resolution, hybrid-kinetic, particle-in-cell simulations of the turbulent dynamo in a collisionless plasma. Our chosen parameters guarantee a healthy scale separation between the forcing scale, the initial ion Larmor radius, and the grid scale. Results will be presented, with a particular focus on growth rates, power spectra, the structure and intermittency of the magnetic field, wave-particle interactions, and the interplay between micro- and macroscales.

Denis St-Onge
Princeton University

Date submitted: 14 Jul 2016 Electronic form version 1.4