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Towards a fully kinetic dynamo simulation[1] ISTVAN PUSZTAI, ANDREAS SUNDSTROM, Chalmers University of Technology, AXEL BRANDENBURG, NORDITA, KTH and Stockholm University, JAMES JUNO, IREAP, University of Maryland, JASON M. TENBARGE, AMMAR HAKIM, Princeton Plasma Physics Laboratory — Dynamo amplification of seed magnetic fields is believed to have produced the currently observed magnetization of galaxy clusters. Due to its inherently three dimensional nature, dynamos have almost exclusively been studied within the framework of magnetohydrodynamics. In order to produce the first fully kinetic dynamo simulation, we have considered a forced Roberts flow in a physical mass-ratio electron-proton plasma with inter and intra-species Lenard-Bernstein collisions. We target a low fluid Reynolds number and high magnetic Reynolds number regime in simulations with the continuum kinetic-Maxwell solver, Gkeyll [J. Juno et al 2018 J. Comp. Phys. 353, 110]. We observe an anomalously high resistivity compared to the Spitzer value, that hinders reaching sufficiently low magnetic diffusivity necessary to produce a growing magnetic field.

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