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Simulating Electron Cyclotron Resonance Heating in Kinetic and Dielectric Plasma Models with VORPAL CHRISTINE ROARK, DAVID SMITHE, PETER STOLTZ, Tech-X Corporation, TECH-X CORPORATION TEAM — We present results of electron cyclotron resonance heating (ECRH) in a plasma sustained by microwaves using VORPAL. Specifically, we look at the electron temperature, sheath size, rate of plasma formation and power absorbed for simulations with an argon gas at 10s of mTorr pressure and 2.45 GHz. We look at the effects of including elastic, inelastic and ionizing Monte Carlo collisions on the formation of the kinetic plasma. We also discuss the use of higher-order particle algorithms for smoothing out the particle current and charge which can help reduce unphysical heating in PIC simulations of high pressure, low temperature plasmas and the effect this has on sheath size and electron temperature. We then compare these simulations to a method replacing the kinetic particles with an equivalent plasma dielectric model.

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