Semiclassical Simulation of Electron Scattering in Warm Dense Plasma Conditions ANDREAS MARKMANN, Yale University, PAUL GRABOWSKI, MICHAEL MURILLO, LANL, FRANK GRAZIANI, LLNL, VICTOR BATISTA, Yale University, CIMARRON COLLABORATION — We introduce an efficient algorithm for dynamics simulation of particles with attractive potentials developed within the Cimarron Project, where electron-proton scattering is to be treated explicitly. Such simulations provide valuable insights and guidance for current experimental efforts at the National Ignition Facility. Electrons rapidly transition between bound and free states, while their environment changes rapidly, requiring simulations to account for quantum effects. Large scale simulations modeling quantum effects need to be tuned by comparison to high accuracy quantum or semiclassical simulations. Our algorithm is applied to semiclassical simulations of electron-proton scattering processes in the Wigner-transform time-dependent picture. Heisenberg uncertainty and interference are compared to exact quantum dynamics. Protons are modeled through full Coulomb potentials and screened Coulomb (Yukawa) potentials, respectively. The relative importance of quantum effects such as uncertainty and interference is inferred from the results.

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