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Self-consistent Simulation of Microparticle and Ion Wakefield Configuration DUSTIN SANFORD, NAOKI ELLIS, BEAU BROOKS, LORIN MATTHEWS, TRUELL HYDE, Baylor University — Within a complex plasma, a directed flow of positively charged ions with respect to negatively charged dust grains often arises. The interactions between the streaming ions and dust particles generates an ion wakefield downstream from the dust particles. The resulting positive space region modifies interactions between the grains and contributes to the dynamics and equilibrium structure of the system. A molecular dynamics simulation is presented as a method for modeling ion wakefields that allows dust particle dynamics to be determined self-consistently. The trajectory of each ion is calculated including the forces from all other ions, which are treated as "Yukawa particles" and shielded from thermal electrons and charged dust particles. Both the dust grain charge and the wakefield structure are self-consistently determined for various particle configurations. The wakefields generated from statically positioned dust particles can be used to provide a self-consistent determination of dust particle positions. These results will be employed to analyze the formation and dynamics of field-aligned chains in CASPER'sPK4 experiment onboard the International Space Station, allowing examination of extended dust chains without the masking force of gravity.

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