Multi-scale simulations of plasma with iPIC3D: the approach and its recent developments

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The code iPic3D is based on the implicit Particle-in-Cell method for the computer simulation of plasmas. Implicit integration in time of the VlasovMaxwell system is used to remove the numerical stability constraints and improve energy conservation. The focus of the presentation will be the suitability of the approach to multiscale problems in plasma physics applied to space, astrophysics and laboratory. After presenting an overview of the approach, the focus will turn to recent developments and current lines of investigation.