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Hybrid model for simulation of plasma jet injection in tokamak[1]
SERGEI A. GALKIN, I.N. BOGATU, FAR-TECH, Inc. — Hybrid kinetic model of plasma treats the ions as kinetic particles and the electrons as charge neutralizing massless fluid. The model is essentially applicable when most of the energy is concentrated in the ions rather than in the electrons, i.e. it is well suited for the high-density hyper-velocity C60 plasma jet. The hybrid model separates the slower ion time scale from the faster electron time scale, which becomes disregardable. That is why hybrid codes consistently outperform the traditional PIC codes in computational efficiency, still resolving kinetic ions effects. We discuss 2D hybrid model and code with exact energy conservation numerical algorithm and present some results of its application to simulation of C_{60} plasma jet penetration through tokamak-like magnetic barrier. We also examine the 3D model/code extension and its possible applications to tokamak and ionospheric plasmas.

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