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Collisionless Spectral Kinetic Simulation of Ideal Multipole Resonance Probe JUNBO GONG, SEBASTIAN WILCZEK, DANIEL SZEREMLEY, Institute of Theoretical Electrical Engineering, Ruhr University Bochum, JENS OBERRATH, Institute of Product and Process Innovation, Leuphana University Lneburg, DENIS EREMIN, Institute of Theoretical Electrical Engineering, Ruhr University Bochum, WLADISLAW DOBRYGIN, Functional Materials and Coating Technologies, Robert Bosch GmbH, CHRISTIAN SCHILLING, Institute of Microwave System, Ruhr University Bochum, MICHAEL FRIEDRICHS, Institute of Product and Process Innovation, Leuphana University Lneburg, RALF PETER BRINKMANN, Institute of Theoretical Electrical Engineering, Ruhr University Bochum — *Active Plasma Resonance Spectroscopy* denotes a class of industry-compatible plasma diagnostic methods which utilize the natural ability of plasmas to resonate on or near the electron plasma frequency ω_{pe}. One particular realization of *APRS* with a high degree of geometric and electric symmetry is the *Multipole Resonance Probe (MRP)*. The Ideal *MRP(IMRP)* is an even more symmetric idealization which is suited for theoretical investigations. In this work, a spectral kinetic scheme is presented to investigate the behavior of the *IMRP* in the low pressure regime. However, due to the velocity difference, electrons are treated as particles whereas ions are only considered as stationary background. In the scheme, the particle pusher integrates the equations of motion for the studied particles, the Poisson solver determines the electric field at each particle position. The proposed method overcomes the limitation of the cold plasma model and covers kinetic effects like collisionless damping.

Junbo Gong
Institute of Theoretical Electrical Engineering, Ruhr University Bochum

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