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A Kinetic Approach to the study of Ideal Multipole Resonance Probe JUNBO GONG, SEBASTIAN WILCZEK, Institute of Theoretical Electrical Engineering, Ruhr-University Bochum, Germany, JENS OBERRATH, Institute of Product and Process Innovation, Leuphana University Lneburg, Germany, DENIS EREMIN, Institute of Theoretical Electrical Engineering, Ruhr-University Bochum, Germany, MICHAEL FRIEDRICHS, Institute of Product and Process Innovation, Leuphana University Lneburg, Germany, RALF PETER BRINKMANN, Institute of Theoretical Electrical Engineering, Ruhr-University Bochum, Germany — Active Plasma Resonance Spectroscopy (APRS) 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. One particular realization of APRS with a high degree of geometric and electric symmetry is 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. The scheme consists of two modules, the particles pusher and the field solver. The particle pusher integrates the equations of motion for the studied particles. The Poisson solver determines the electric field at each particle position. The fluid model is studied to provide the initial conditions of simulation for optimization reason. The proposed method overcomes the limitation of the cold plasma model and covers kinetic effects like collisionless damping.

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