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Ideal Multipole Resonance Probe: a Spectral Kinetic Approach JUNBO GONG, Ruhr-University Bochum, MICHAEL FRIEDRICHS, Leuphana University Luneburg, CHUNJIE WANG, SEBASTIAN WILCZEK, DENIS EREMIN, Ruhr-University Bochum, JENS OBERRATH, Leuphana University Luneburg, RALF PETER BRINKMANN, Ruhr-University Bochum — 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 proposed kinetic model overcomes limitation of the cold plasma model and covers kinetic effects such as collisionless damping. Most importantly, it provides the possibility to calculate both the electron temperature and electron density from measured resonance curves.

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