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Block matrix based LU decomposition to compute kinetic spectra of the Multipole Resonance Probe[1] JENS OBERRATH, Institue of Product and Process Innovation, Leuphana University Lueneburg — The multipole resonance probe (MRP) is a diagnostic tool to measure electron densities and electron temperatures in low pressure plasmas. It is based on the concept of active plasma resonance spectroscopy and excites a resonance of the dipole mode, where the resonance frequency is proportional to the electron plasma frequency. From the half width of the resonance peak the electron temperature could be measured, but the peak is broadened by kinetic effects and requires a kinetic model to predict the correct half width. Such a model in electrostatic approximation based on functional analytic methods is derived and yields the admittance Y as response function of the probe-plasma system. To approximate specific spectra of Y functional analytic methods can also be applied. This approach leads to a huge system of linear equations, which is characterized with a block structured matrix. To solve this linear system of equations, a block matrix based LU decomposition can be applied to reduce the memory in use. The resulting spectra show a broadening of the resonance peak and will be investigated to determine a relation between the half width and the electron temperature.

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