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Theory Experiment

Time Dependent Solution for the He I Line Ratio Electron Temperature and Density Diagnostic in TEXTOR and DIII-D,*
J.M. Munoz Burgos, *ORISE*; O. Schmitz, *FZ-Juelich*; E.A. Unterberg, *ORNL*; S.D. Loch, C.P. Balance, *Auburn U.* –We present a new time-dependent solution for the He I line ratio diagnostic. A stationary solution is applied for L-mode at TEXTOR. The radial range is typically limited to a region near the separatrix due to metastable effects, and the atomic data used. We overcome this problem by applying a time dependent solution and thus avoid unphysical results. We use a new R-Matrix With Pseudostates and Convergence Cross-Coupling electron impact excitation and ionization atomic data set into the Collisional Radiative Model (CRM). We include contributions from higher Rydberg states into the CRM by means of the projection matrix. By applying this solution (to the region near the wall) and the stationary solution (near the separatrix), we triple the radial range of the current diagnostic. We explore the possibility of extending this approach to H-mode plasmas in DIII-D by estimating line emission profiles from electron temperature and density Thomson scattering data.

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