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Ne spectral emission measurements and theoretical modeling for the ASTRAL helicon plasma JORGE MUNOZ BURGOS, STUART LOCH, ROBERT BOIVIN, ANDREW KESTERSON, Auburn University — A review of the atomic data available for the first few ion stages of neon is given. We also present some new atomic data that uses a recently developed code to optimize the atomic structure used in the electron impact excitation calculation. The code adjusts the orbital scale factors to get the best energies and oscillator strengths. We compare our new structure with the level (term) energies, and line strengths given by NIST. Our optimised structure calculation is used in an R-matrix with pseudo-states calculation to compute electron-impact excitation data. Some comparisons are given between the predicted and observed neon spectra from ASTRAL. Recent measurements of neon spectra from the Auburn helicon plasma ASTRAL (Auburn Steady sTate Research fAciLity) are described. A spectrometer which features a 0.33 m Criss-Cross Scanning monochromator and a CCD camera is used for this study. The electron density in the plasma can vary from Ne = 10^{11} to 10^{13} cm^{-3} and the electron temperature can vary from Te = 2 to 10 eV. Spectral emission is seen from neutral Ne and the first two ion stages. A rf compensated Langmuir probe is used to measure Te and Ne. We also present some collisional-radiative modeling results for neon spectra using the ADAS suite of codes. The variation of Ne and Te along the line of sight is included in the model.

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