Abstract Submitted
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Validation of Atomic Data Using a Plasma Discharge[1] DIRK DODT, ANDREAS DINKLAGE, Max-Planck-Institut fuer Plasmaphysik, EURATOM Association, Greifswald, Germany, KLAUS BARTSCHAT, OLEG ZATSARINNY, Drake University — Using a neon discharge as a well-assessed reference, we demonstrate how such an arrangement can be employed to validate atomic data for discharge modeling. Specifically, a collisional-radiative-model of a neon DC discharge was set up using a set of structure and collision data from a semirelativistic B-spline R-matrix calculation [1], and the electron-energy distribution function of the plasma was determined from the spectroscopic measurement [2]. Since the model covers almost the entire visible spectrum, considering a large number of emission lines and all collisional coupling mechanisms enabled us to thoroughly test the consistency of the modeled excited-state populations. Inconsistencies, which appear as correction factors for rate coefficients, were extracted by means of Bayesian probability theory. Despite its limitations, the sensitivity of the approach was sufficient to provide critical information about the collision data, especially in cases where standard cross-section measurements using merged electron and atom beams are difficult to perform. The present approach thus complements experimental techniques to test theoretical predictions. [1] O. Zatsarinny and K. Bartschat, J. Phys. B **37**, 2173 (2004). [2] D. Dodt *et al.*, J. Phys. D **41**, 205207 (2008).

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