

Abstract Submitted  
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**Determination of the EEDF using a Bayesian analysis framework**

DOMINIC POZNIC, ALEX SAMARIAN, BRIAN JAMES, School of Physics, University of Sydney — A statistical analysis framework is presented that determines the electron energy distribution function (EEDF) of an argon discharge plasma from optical emission spectra and Langmuir probe data. The analysis framework is based on Bayesian inference, in which data are treated in a rigorously statistical manner, that naturally includes all sources of uncertainty. The framework is designed to allow models describing different data sets from the same system to be combined in a straightforward manner. Spectral line intensities are described using a collisional-radiative model, while Langmuir probe data are described with a simple 1D Langmuir probe model. The models are inverted and combined using Bayesian probability theory in a joint analysis of both data sets. This framework was tested using data simulated by the two models from a known set of plasma conditions. The testing confirmed the ability of the framework to determine non-Maxwellian EEDFs and use multiple data sets to increase the accuracy of results.

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