

Abstract Submitted
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Genetic-algorithm-assisted reconstruction of arbitrary EEDF of atmospheric-pressure plasma using optical emission spectroscopic measurement THIJS VAN DER GAAG, HIROSHI AKATSUKA, Tokyo Institute of Technology — Recent increased interest in non-equilibrium atmospheric pressure plasma applications in e.g. medical treatments and agriculture leads to a need for more insight in the behavior of these plasmas. Knowledge of the electron energy distribution function (EEDF) is a central element in understanding the plasma state, making it worthwhile to expand our knowledge beyond the existing EEDF models. Here, a method is developed to determine the EEDF based on optical emission spectroscopic measurement meaning that the use of probes is not needed. Under atmospheric conditions, electron-atom bremsstrahlung is considered to be the dominant source of continuum emission. A genetic algorithm is used to match a unique, arbitrary EEDF solution to the emissivity data. With realistically available OES data (300-800nm), an accurate and complete (up to 20 eV) EEDF can be obtained using this algorithm. The current state of the algorithm, validation results by comparison to EEDF models and potential applications will be discussed.

Thijs Van Der Gaag
Tokyo Institute of Technology

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