Abstract Submitted
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Emission model for determining EEDF in low-pressure oxygen plasmas[1] JESSICA PACHICANO, JOHN B. BOFFARD, COLIE KEANE, NATHANIEL LY, COLIN SWEE, CHUN C. LIN, AMY WENDT, University of Wisconsin - Madison — Non-invasive diagnostics based on optical emission spectroscopy (OES) to determine the electron energy distribution function (EEDF) are an attractive tool for optimization and control of technological plasmas. Progress will be reported on an oxygen emission model for O and O_2^+ emitting states that accounts for both excitation and de-excitation, using the EEDF as an input. In addition to previously known excitation cross sections, the model also requires rates for the excitation of O_2^+ from the ion ground state as well as electron quenching of emitting states. Our past efforts have primarily used atomic O emission lines along with emission bands of the O_2^+ first negative system (FNS). Emissions from the O_2^+ second negative system (SNS) enhance the model, since they vary with plasma conditions differently than those of the FNS. Excitation and quenching parameters for FNS and SNS bands have been determined by fitting emission intensities as a function of electron density using data recorded at 2.5-30 mTorr and ICP powers of 100-2000 W. Preliminary results from application of the completed emission model to determine EEDFs, by finding the best match between emission model relative intensities and experimentally measured values, will also be presented.

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