Abstract Submitted
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Use of "tuned" particle in cell simulations for absolute atomic oxygen number density determination using actinometry[1] JIM CONWAY, SAMIR KECHKAR, MILES TURNER, STEPHEN DANIELS, National Centre for Plasma Science and Technology - Dublin City University — Actinometry is an optical diagnostic technique that can be used to quantitatively monitor atomic oxygen number density [O] in plasma. However, careless application of the technique can yield inaccurate information regarding atomic oxygen behavior in the plasma. One limitation on this technique is an accurate knowledge of the rate constants required, which is in turn hampered by an insufficiently precise knowledge of the plasma Electron Energy Distribution Function (EEDF). In this work Particle in Cell (PIC) simulations are used to generate theoretical EEDFs. To validate a simulation the electron density ne produced by the PIC code is compared to experimental ne values and PIC input parameters adjusted to optimize agreement between the PIC and experimental ne results thus "tuning" the simulation. The resulting EEDF is used to generate rate constants for the actinometry model which should improve the accuracy of the quantitative [O]. This approach was applied to an asymmetric capacitively coupled RF plasma source. The actinometry [O] results are then compared to [O] results obtained using Two-photon Absorption Laser Induced Fluorescence (TALIF) to validate this approach.

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