Abstract Submitted
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Measuring atomic oxygen densities and electron properties in an Inductively Coupled Plasma for thin film deposition.[1] DAVID MEEHAN, York Plasma Institute, University of York, ANDREW GIBSON, York Plasma Institute, University of York and Laboratoire de Physique des Plasmas, Ecole Polytechnique, JEAN-PAUL BOOTH, Laboratoire de Physique des Plasmas, Ecole Polytechnique, ERIK WAGENAARS, York Plasma Institute, University of York — Plasma Enhanced Pulsed Laser Deposition (PE-PLD) is an advanced way of depositing thin films of oxide materials by using a laser to ablate a target, and passing the resulting plasma plume through a background Inductively-Coupled Plasma (ICP), instead of a background gas as is done in traditional PLD. The main advantage of PE-PLD is the control of film stoichiometry via the direct control of the reactive oxygen species in the ICP instead of relying on a neutral gas background. The aim is to deposit zinc oxide films from a zinc metal target and an oxygen ICP. In this work, we characterise the range of compositions of the reactive oxygen species achievable in ICPs; in particular the atomic oxygen density. The density of atomic oxygen has been determined within two ICPs of two different geometries over a range of plasma powers and pressures with the use of Energy Resolved Actinometry (ERA). ERA is a robust diagnostic technique with determines both the dissociation degree and average electron energy by comparing the excitation ratios of two oxygen and one argon transition. Alongside this the electron densities have been determined with the use of a hairpin probe.

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