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**Modelling the plasma plume of an assist source in PIAD** JOCHEN WAUER, JENS HARHAUSEN, RÜDIGER FOEST, DETLEF LOFFHAGEN, Leibniz Institute for Plasma Science and Technology — Plasma ion assisted deposition (PIAD) is a technique commonly used to produce high-precision optical interference coatings. Knowledge regarding plasma properties is most often limited to dedicated scenarios without film deposition [1]. Approaches have been made to gather information on the process plasma in situ [2] to detect drifts which are suspected to cause limits in repeatability of resulting layer properties. Present efforts focus on radiance monitoring of the plasma plume of an Advanced Plasma Source (APSpro, Bühler) by optical emission spectroscopy to provide the basis for an advanced plasma control. In this contribution modelling results of the plume region are presented to interpret these experimental data. In the framework of the collisional radiative model used [3], 15 excited neutral argon states in the plasma are considered. Results of the species densities show good consistency with the measured optical emission of various argon  $2p - 1s$  transitions.

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[1] Harhausen et al., *Plasma Sources Sci. Technol.* **21** (2012) 035012

[2] Styrnoll et al., *Plasma Sources Sci. Technol.* **22** (2013) 045008

[3] Harhausen et al., *J. Phys. D: Appl. Phys.* **48** (2015) 045203

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