

Abstract Submitted
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Time and space-resolved measurements of the neutral gas density in a helicon reactor by TALIF LAURENT LIARD, ANE AANESLAND, JACQUES JOLLY, JEAN-LUC RAIMBAULT, PASCAL CHABERT, LPTP - CNRS UMR 7648 — Contemporary plasma reactors used for plasma processing or space plasma propulsion (Inductively Coupled or Helicon plasmas for instance) are characterized by a high electronic density. In these reactors, the electronic pressure can be as high as the neutral pressure, resulting in neutral depletion effects in the centre of the discharge. This phenomenon has been recently studied both theoretically (using fluid models¹ and experimentally.^{2,3} In this presentation, we are interested in the dynamics of this phenomenon. By using a two photon laser induced fluorescence (TALIF) diagnostic in Xenon gas, radial measurements of the Xenon ground state density at different times are performed. We have studied both the ignition phase, and the afterglow relaxation. It appears, as expected, that the depletion in the centre occurs in a short time-scale, typically in the millisecond range. However, a longer timescale effect has also been observed, due to a change in the pumping speed.

¹J.-L. Raimbault *et al*, **PoP**, 2007, 14, 013503

²A. Aanesland *et al*, **Appl. Phys. Lett.**, 2007, 91, 121502

³D. O'Connell *et al*, **J. Phys. D**, 2008, 41, 035208

Laurent Liard
LPTP - CNRS UMR 7648

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