Abstract Submitted
for the DPP07 Meeting of
The American Physical Society

Nonlocal Control of Plasma Properties in a Pulsed RF ICP in Argon-Oxygen Mixtures JON BLESSINGTON, West Virginia University Q-Group, CHARLES DEJOSEPH, Air Force Research Laboratory, VLADIMIR DEMIDOV, MARK KOEPKE, West Virginia University Q-Group — Previously [1], we showed that a simple, three-level model could explain the rapid growth of charged particles (measured by probes) following application of rf power to a noble gas. In argon + O2 mixtures, the growth rate of O-atom density is slow compared to the growth rate of the charged particle densities. This growth can be estimated from plasma emission and from numerical modeling of the discharge. As a result, the positive ion density reaches a stationary value much faster than the atomic oxygen density. Thus, by changing the duration of the rf pulse, the ratio of fast electron production, from the reaction O + O- → O2 + e (3.6 eV), compared to the ambipolar flux of positive ions to the discharge walls, can be controlled. This effect can be used for nonlocal regulation of the plasma properties [2].

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Date submitted: 20 Jul 2007 Electronic form version 1.4