

Abstract Submitted
for the GEC05 Meeting of
The American Physical Society

Self pulsing microdischarge in argon ANTOINE ROUSSEAU, XAVIER AUBERT, LPTP-ECOLE POLYTECHNIQUE CNRS PALAISEAU FRANCE TEAM — Microdischarge is generated in the hole made in a conductor-dielectric-conductor sandwich in pure argon [1]. At low discharge current, the plasma is confined inside the micro-hole and the voltage increases with the current (abnormal regime). At higher current the plasma is expended in the backside cathode region and the voltage is insensitive to the discharge current (normal regime). Between these two stable operating mode, for intermediate current value self-pulsing current oscillations are observed [2]. It is shown that the self-pulsing frequency is a linear function of the averaged current and depends only on the pxD product, for a wide range of hole diameter D and gas pressure p . Time resolved optical emission spectroscopy measurements performed in the cathode backside indicate that such oscillations are caused by short plasma expansions ($2-5 \mu s$) towards the cathode backside and correspond to a transient change between the abnormal and normal regime. The related pulse duration does not depend on the averaged current. Authors thank L.C. Pitchford, J.P. Boeuf and V. Puech for discussions.

[1] K. H. Schoenbach, R. Verhappen, T. Tessnow, F. E. Peterkin, W. W. Byszewski, Appl. Phys. Lett. **68** (1996) 13

[2] D.D. Hsu and D. B. Graves J. Phys. D: Appl. Phys. 36 (2003) 2898.

Antoine Rousseau
LPTP-Ecole Polytechnique-CNRS

Date submitted: 10 Jun 2005

Electronic form version 1.4