Abstract Submitted
for the GEC06 Meeting of
The American Physical Society

Capacitive Coupled Single- and Dual-Frequency RF Plasma in Argon OLGA PROSHINA, OLEG BRAGINSKY, VLADIMIR IVANOV, ALEXANDER KOVALEV, DMITRY LOPAEV, TATYANA RAKHIMOVA, ANNA VASILIEVA, Institute of Nuclear Physics, Moscow State University, Russia — Capacitively coupled radio-frequency Ar plasma operated both in the Single Frequency (SF) and Dual Frequency (DF) regimes at high specific input powers has been studied both experimentally and theoretically in a pressure range of 20 mTorr - 100 mTorr. In the SF regime the discharge was operated at 1.76, 13.56 and 81 MHz. In the DF regime two frequencies combinations were used: **i** 13.56 – 81 MHz; **ii** 1.76 – 81 MHz. The measurements of the plasma density and the electron temperature by a Langmuir probe in the center between the electrodes as a function of the dissipated RF power were carried out. It was revealed that the low frequency (LF) power affects the electron density in a pressure range of 45 – 100 mTorr. The decrease of the pressure to 20 mTorr results in an absence of the LF power influence on the electron density and consequently leads to the frequency decoupling. The PIC MC simulation was carried out to analyze the experimental data. It was shown that in SF discharge at 1.76 and 13.56 MHz the role of the secondary electron emission (SEE) is significant. The HF discharge at 80 MHz is operated in α-mode at the same powers. The role of SEE on the DF discharge operation is significant at the studied conditions. The frequency decoupling takes place for the conditions when the sheaths are almost collisionless for γ-electrons.

Olga Proshina
Institute of Nuclear Physics, Moscow State University, Russia

Date submitted: 16 Jun 2006 Electronic form version 1.4