Abstract Submitted
for the GEC06 Meeting of
The American Physical Society

Low-pressure gas breakdown in dual-frequency (27/2 MHz) RF electric fields in nitrogen VALERIY LISOVSKIY[1], JEAN-PAUL BOOTH[2], Laboratoire de Physique et Technologie des Plasmas, Ecole Polytechnique, Palaiseau 91128, France, KARINE LANDRY, DAVID DOUAI, VALERICK CASSAGNE, Unaxis Displays Division France SAS, 5, Rue Leon Blum, Palaiseau 91120, France, VLADIMIR YEGORENKOV, Kharkov National University, Kharkov 61077, Ukraine — We present measured breakdown curves for dual-frequency (27.12 /2 MHz) discharges in nitrogen. RF voltages at frequencies of 27.12 MHz (HF) and 2 MHz (LF) were fed to the same powered electrode whereas another one was grounded. The inter-electrode gap was 20.4 mm. The 27 MHz breakdown curve is shifted to higher voltages and gas pressures when a 2 MHz voltage (<300 V) is added, due to the increased loss of electrons due to the drift in the LF field. At LF voltages above 300 V the LF field contributes to gas ionization. Positive ions oscillating in the enhanced LF field can collide with the electrode surface and produce secondary electrons. Therefore the HF breakdown voltage is decreased and approaches zero (a self-sustained LF discharge is ignited). Adding an HF voltage always leads to a decrease in the LF breakdown voltage because of the reduction of electron losses due to oscillations in the HF field.

[1]Kharkov National University, Kharkov 61077, Ukraine
[2]Currently at Lam Research Corporation, 4650 Cushing Parkway, Fremont, CA 94538, USA

Valeriy Lisovskiy
Laboratoire de Physique et Technologie des Plasmas,
Ecole Polytechnique, Palaiseau 91128, France

Date submitted: 14 Jun 2006 Electronic form version 1.4