Abstract Submitted
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Experimental Study of Sheath Voltage Scaling Laws in Asymmetric RF Capacitive Discharges[1] MILKA NIKOLIC, JANARDAN UPADHYAY, LEPSHA VUSKOVIC, SVETOZAR POPOVIC, Old Dominion University, Physics Department, Center for Accelerator Science — Asymmetric radio frequency (RF) capacitive discharges have been attracting a continuous interest in ongoing research on complex shaped, three dimensional niobium superconducting radio frequency (SRF) cavities. To increase their performance, the SRF cavities can be etched by capacitively coupled RF discharges, a technology already used in semiconductor industry. Since the SRF performance parameters depend highly on plasma properties, we have studied the effects of different pressure, power and inner and outer electrode area ratio on the sheath voltage scaling laws in the finite length coaxial symmetry RF capacitive discharge, treated originally in [1]. The experimental set up used in this study consists of two finite-length cylindrical coaxial electrodes, the inner RF powered electrode and the outer grounded electrode. We performed the experiment in Ar and in 15% Cl diluted with Ar mixture at pressure range 0.0375 – 0.45 Torr and applying the powers from 25 – 200 W. The results are presented in the form of asymmetric sheath voltage scaling law.

[1] M. V. Alves, M. A. Lieberman, V. Vahedi, and C. K. Birdsall, J. Appl. Phys. **69**, 3823 (1991).

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Milka Nikolic
Old Dominion University, Physics Department, Center for Accelerator Science

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