Abstract Submitted
for the GEC18 Meeting of
The American Physical Society

Electron-induced secondary electrons in low-pressure capacitively coupled radio-frequency plasmas[1] BENEDEK HORVATH, Wigner Research Centre for Physics, JULIAN SCHULZE, Ruhr-University Bochum, West Virginia University, KATHARINA NOESGES, SEBASTIAN WILCZEK, Ruhr-University Bochum, ZOLTAN DONKO, Wigner Research Centre for Physics, ARANKA DERZSI, West Virginia University, Wigner Research Centre for Physics — We investigate the effects of secondary electrons (SEs) induced by electrons on the discharge characteristics in low-pressure single-frequency capacitively coupled plasmas (CCPs) by Particle-in-Cell/Monte Carlo Collisions simulations. Such SEs (δ-electrons) were found to have a remarkable influence on the plasma parameters in argon at 0.5 Pa and 6.7 cm gap between SiO_2 electrodes (B. Horváth et al. 2017 *Plasma Sources Sci. Technol.* **26** 124001). Here we study the impact of δ-electrons on the ionization dynamics and plasma parameters at various pressures and voltage amplitudes, assuming different SE yields for ions (γ-coefficient). The voltage amplitude, the gas pressure and the value of the γ-coefficient affect the role of δ-electrons in the ionization dynamics. While their effect is most striking at low pressures, high voltage amplitudes and high γ-coefficients, in the whole parameter regime investigated here the realistic description of the electron-surface interaction changes significantly the computed plasma parameters compared to results based on a widely used simple model for the description of the electron-surface interaction.

[1]This work was supported by the US NSF grant no. PHY 1601080, by the DFG (SFB-TR 87), and Hungarian grants K-119357 and PD-121033.

Benedek Horvath
Wigner Research Centre for Physics

Date submitted: 15 Jun 2018 Electronic form version 1.4