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Two modes of ccp rf discharge in CF₄¹ OLGA PROSHINA, TATYANA RAKHIMOVA, ALEXANDER RAKHIMOV, DMITRY VOLOSHIN, Skobeltsyn Institute of Nuclear Physics, Moscow State University — Ccp rf discharge in CF₄ has been studied by the use of a 1D PIC MC model. Two different discharge modes are observed depending on discharge conditions: the regime of electronegative plasma with high electron temperature in the bulk and the regime of electropositive plasma with abnormally low electron temperature in the bulk. Characteristic features of two discharge modes are considered. The sharp transition from the former to the last mode is observed with the increase in applied voltage. The dependence of the transition voltage on gas pressure is analyzed. In the studied range of gas pressures the existence of the high temperature mode in CF₄ is provided by the balance between ionization rate and attachment rate in the bulk region. As a result the transition voltage increases with the gas pressure because of the increased relative role of electron attachment. It is shown that the differences in the used electron cross section sets may noticeably affect the simulation results and discharge properties. Three different electron cross section sets for CF₄ are considered. In particular, the transition voltage between two discharge modes differs essentially for different cross sections used.

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Olga Proshina
Skobeltsyn Institute of Nuclear Physics, Moscow State University

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