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Thermal ionization instability development in air plasma generated by repetitive ns dielectric barrier discharge ANDREY STARIKOVSKIY, MIKHAEL SHNEIDER, Princeton University, DANIIL MARINOV, SVETLANA STARIKOVSKAIA, Ecole Polytechnique, PU TEAM, LPP TEAM — The aim of this paper is to study a transformation of a nanosecond discharge under conditions of high repetitive frequency in a barrier configuration of the electrodes. Nanosecond DBDs at atmospheric pressure are widely used for research in plasma medicine. At atmospheric pressure conditions the discharge develops as a set of microchannels bridging a gap between the electrodes covered with dielectric, the current in each microchannel is restricted by charging of a dielectric surface. With pressure decrease, a discharge becomes more uniform, still it is known that a slight change of a gas mixture composition, f.e. add of a fuel, may lead to significant problems with the uniformity. Estimations were made to analyze the possibility of discharge contruction due to thermal ionization instability development. We used the assumption that there is no convective cooling of the gas in the discharge cell. It was shown that NS discharge in DBD geometry is non-uniform. Initial electrical fields distribution and thermal ionization instability development form the non-uniform energy distribution in the discharge. This non-uniformity can play a key role in kinetic experiments in this type of the discharge.

Andrey Starikovskiy
Princeton University

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