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Dynamic of microparticles in vacuum breakdown. BENJAMIN SEZNEC, LPGP UMR 8578, CNRS, Univ. Paris-Sud, Orsay, Fance, PHILIPPE DESSANTE, Geeps, , UMR 8507, CNRS, CentraleSupelec, gif, france, TOBIAS JAEGER, LISE CAILLAULT, LPGP UMR 8578, CNRS, Univ. Paris-Sud, Orsay, Fance, PHILIPPE TESTE, Geeps, , UMR 8507, CNRS, CentraleSupelec, gif, france, TIBERIU MINEA, LPGP UMR 8578, CNRS, Univ. Paris-Sud, Orsay, Fance — Numerous applications, such as X-ray tubes or particle accelerators, use vacuum as of high voltage isolator. Their performance is limited by the risk of unpredictable breakdown events between electrodes. Moreover, the breakdown usually leads to the formation of arc discharges, which can damage the electrodes. This research aims to give a better description of the origin of the vacuum breakdown. One assumption considers the effect induced by the transport of micro-particles (MP) in the inter-electrodes gap. After their release from hot spots at the anode, MP are exposed to an intense field ˜1-5 MV/m, and are bombarded by electrons released from the cathode micro-tips. These electrons can change the MP charge and can lead to partially/completely vaporization of the MP. The model OFEN (Orsay Field Emission Nanoparticles) developed at LPGP describes the MP transport in the inter-electrodes gap and the interactions (heating and modification of the MP charge) between electrons and the MP. The results clearly show four regimes of MP trajectories obtained for different emission currents, MP sizes and inter-electrode distances and the effect of the MP crash on the cathode.

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