

## PIC simulation of vacuum arc

*Thursday 7 November 2013 11:00 (30 minutes)*

A better understanding of vacuum arc is essential in current breaking vacuum switches. There are multiple process involved during the arcing process not limited to 1) Explosive emission from cathode surfaces due to thermal runaway and effect of space charges 2) influence of particles 3) influence of anode in case of high current arc 4) modification of contact surface. In order to incorporate these processes a multi-scale model is needed to simulate vacuum arc. With that aim I am proposing atomistic approach based on partial in cell method to simulate the vacuum arc, commercial PIC code MAGIC 2D/3D will be used for the same. Ionization caused by the impact of primary and secondary emission electrons can be modelled both in 2D and 3D using both particle-only and hybrid particle-fluid models. Energetic primary electrons and low energy secondary ionization products which are also capable of ionizing neutrals can also be treated with the code. Processes of electron attachment to neutral species, recombination with ions, and neutralization of ions can also be simulated. Assuming the presence of a field emitter at the cathode initially, we can identify the conditions for plasma formation and can study the transitions from field emission stage to a fully developed arc.

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