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Service de Physique de l'Etat Condensé - UMR 3680

SÉMINAIRE SPECIALISE

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Molecular dynamics-based simulations for vacuum electronics

We describe a novel, molecular dynamics based, code for simulation of nano- and microscale vacuum electronics systems. The code includes full Coulomb interaction between every free elctron in the vacuum region, self-consistent emission physics, and image-charge based treatment of boundary conditions. The code has been succesfully used to model electron dynamics in charge influenced field emission [1] as well as in the fully space-charge limited regime [2]. The characteristics of the code will be described as well as some illustrative results and plans for future work.

This work was done in collaboration with Andrei Manolescu, Kristinn Torfason, Andreas Pedersen, Marjan Ilkov, Pálmar Jónsson, Hákon Valur Haraldsson, Bjarni Hannesson, and Hákon Örn Árnason.

1 - *K. Torfason, A. Valfells, A. Manolescu, "Molecular Dynamics Simulations of Field Emission from a Planar Nanodiode", Phys. Plasmas 22, 033109 (2015).*
2 - *A. Pedersen, A. Manolescu, Á. Valfells, "Space-Charge Modulation in Vacuum Microdiodes at THz Frequencies", Phys. Rev. Lett. 104, 175002 (2010).*
