FAKULTÄT für PHYSIK
LUDWIG-MAXIMILIANS-UNIVERSITÄT
MÜNCHEN/GARCHING

PHYSIK-DEPARTMENT
TECHNISCHE UNIVERSITÄT MÜNCHEN
MÜNCHEN/GARCHING

Garchinger Maier-Leibnitz-Kolloquium

Donnerstag, 18.07.2024, 16^{15} Uhr

Hörsaal der LMU in Garching, Am Coulombwall 1
Treffen zum gemeinsamen Kaffee 16 Uhr

Prof. Marcel Toulemonde

(Centre de Recherche sur les Ions, les Matériaux et la photonique, CIMAP (CEA, CNRS, ENSICAEN, Univ. Caen) Caen, France)

Model for the description of track formation: a transient thermal process

Heavy ion track investigations produced with swift heavy projectiles in the electronic energy loss regime show that the damage exhibits a strong dependence on material properties on contrary of the one induced by nuclear collisions. The model should describe track formation showing several phenomena such as the dependence of the track size on energy loss, beam velocity and material sensitivity, the critical energy loss for track formation, the core-shell structure of the track and surface sputtering. Here a theoretical description of track formation based on a transient thermal process called the inelastic thermal spike model will be presented. This thermodynamic approach combines the initial size of the energy deposition with the subsequent diffusion process in the electronic subsystem of the target before its transfer to the lattice via the electron-phonon coupling. The track size, resulting from the quench of a molten phase and/or vapour phase, is determined as a cylinder in which the energy density deposited on the atoms surpassed the energy necessary to melt and/or to vaporize and the sputtering is linked to surface sublimation. Critical review of the result will be presented.

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Meeting ID: 984 5733 2925
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