

GSI - FAIR Colloquium

Main Lecture Hall (SB1 1.120), 64291 Darmstadt, Planckstraße 1

*Tuesday, May 24, 2016,
16:15 Uhr (Tee ab 15:45)*

Pre-colloquium for students at 15:30

*David J. Hinde
Heavy Ion Accelerator Facilities
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*Dynamics of nuclear collisions forming new superheavy elements:
competition between fusion and quasifission*

Quasifission is a dynamical process first identified at GSI, resulting in rapid separation of the dinuclear system initially formed when two heavy nuclei come into contact. Quasifission can suppress the production of superheavy elements by many orders of magnitude. Extensive experiments with projectiles from C to Ni at the Australian National University Heavy Ion Accelerator Facility have mapped out quasifission characteristics and systematics using mass-angle distributions (MAD), which show the fission mass-split as a function of centre-of-mass scattering angle. These MAD provide information on quasifission dynamics in the most model-independent way. Comparison of experimental MAD with quantum many-body TDHF calculations give quite good agreement. Measurements made at low beam energies, near the capture barrier, show dramatic effects of the nuclear structure of the two colliding nuclei on quasifission probabilities and characteristics. The effects of deformation alignment, closed shells and N/Z matching can completely change collision outcomes, which will strongly influence superheavy element production yields.

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