Physikalisches Institut
Fakultät für Mathematik und Physik
Albert-Ludwigs-Universität Freiburg

IRTG-Seminar

Jutta Toscano

Merton College, University of Oxford

“Cold state-selected radicals for the study of low temperature chemistry”

In order to obtain a pure source of cold state-selected radicals, we combine a Zeeman decelerator, which slows down a subset of the radicals in a supersonic beam using pulsed magnetic fields, with a newly designed magnetic guide. The latter serves to purify the output of the decelerator, yielding a pure beam of cold, state- and velocity-selected radicals which is ideal for collision studies.

I will introduce a new deceleration mechanism that we observe when optimising the deceleration switching sequences using evolutionary algorithms. This novel mode of operation of a decelerator, which relies on adding particles to the phase-stable bunch as the deceleration proceeds, yields more decelerated particles and lower final velocities than those achievable using standard switching sequences.

I will also present a novel design for a magnetic guide that can be used after a Zeeman decelerator, or after any supersonic or effusive beam, to select only radical species with a specific desired velocity within a narrow velocity distribution. The resulting cold, state- and velocity-selected radical beam will enable us to study ion-radical collisions with enhanced control over the properties of the radical reactants.

Tuesday, January 30, 2018, 1:00 p.m., HS II,
Physics high rise, Hermann-Herder-Str. 3

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