Physikalisches Institut
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Albert-Ludwigs-Universität Freiburg

PHYSIKALISCHES KOLLOQUIUM

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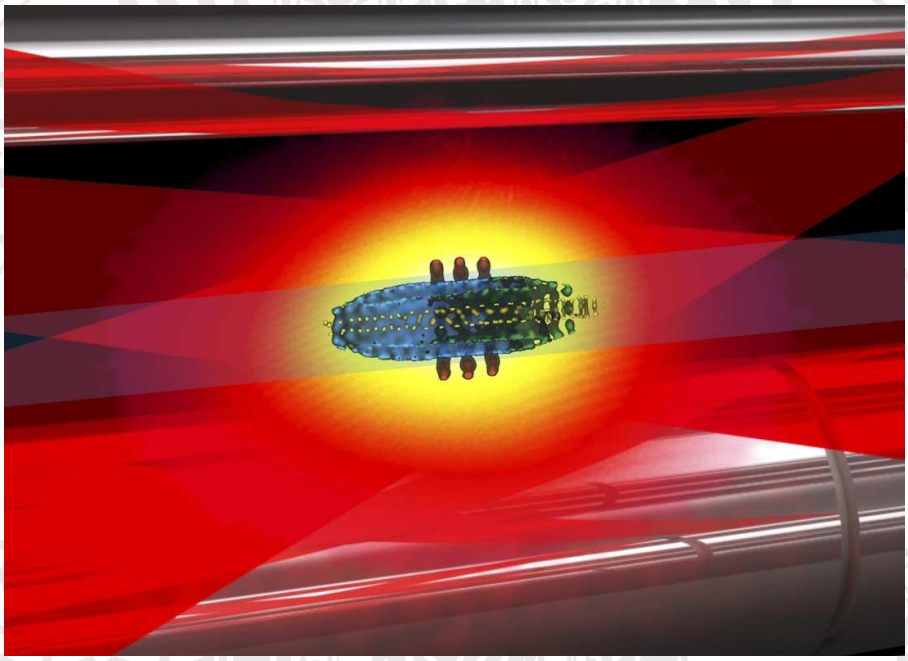
IM GROßEN HÖRSAAL



REACTIVE COLLISIONS WITH COULOMB-CRYSTALLIZED IONS IN TRAPS: FROM STUDYING CHEMICAL PROCESSES AT MILLIKELVIN TEMPERATURES TO PROBING THE REACTIVITY OF SELECTED CONFORMATIONS OF LARGE MOLECULES

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Recent advances in the preparation of quantum-state selected atomic and molecular ions at millikelvin temperatures in ion traps have opened up possibilities to investigate and control chemical processes at an unprecedented level of detail. We will discuss recent studies on reactive collisions between cold and spatially localized ("Coulomb-crystallized") ions in traps with ultracold atoms in a magneto-optical trap to illustrate the exotic chemical processes occurring at extremely low temperatures. We will also highlight recent results on reactive collisions between fully state-prepared cold molecular ions and internally cold neutral molecules at precisely defined collision energies to illustrate the exquisite level of detail at which chemical reactions can be studied using Coulomb-crystal techniques. We will also present first results from a new experiment aiming at the study of chemical reactions between Coulomb-crystallized ions and conformationally selected molecules in the gas phase enabling to probe the chemical reactivity of specific structural isomers of complex molecules.