Reactions with relativistic radioactive beams
Recent results from GSI and future plans at GSI and FAIR

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Reactions with fast radioactive-ion beams may provide fundamentals for the understanding of astrophysical processes in a twofold way: Firstly, reaction studies are revealing properties of neutron-proton asymmetric nuclei and nuclear matter which are of key relevance for many nuclear processes in the universe including the properties of neutron stars. Secondly, cross sections important for certain astrophysical scenarios can be directly extracted from measurements with radioactive beams, often by studying the inverse reaction. An example is the Coulomb breakup reaction from which neutron or proton capture cross sections can be determined [1]. Information on fundamental quantities like the symmetry energy and the equation of state of asymmetric nuclear matter might be extracted from the excitation of collective dipole modes in neutron-rich nuclei [2,3]. Examples will be discussed and an outlook will be given on prospects of rare-isotope beam experiments at the future GSI and FAIR accelerators [4].

**References**