

Prof. Dr. Hans Jockers
Institut für Physik
jockers@uni-mainz.de

Prof. Dr. Concettina Sfienti
Institut für Kernphysik
sfienti@uni-mainz.de

JOHANNES GUTENBERG
UNIVERSITÄT MAINZ



Physikalisches Kolloquium

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HS KPH

Prof. Dr. Tom Aumann
TU Darmstadt & GSI Darmstadt

Quasi-free scattering experiments in inverse kinematics with high-energy radioactive beams - Applications to the study of short-range nucleon-nucleon correlations and multi-neutron systems

Reactions with short-lived nuclei are key to understand the properties of neutron-rich nuclei and neutron-rich nuclear matter. In recent years, quasi-free scattering experiments have been developed and established for experiments with radioactive beams at GSI and RIKEN. The inverse kinematics of the reaction opens thereby the possibility for a complete characterisation of the final state, which results in an almost background-free measurement. Recent results with stable and radioactive beams will be discussed including the first measurement of short-range correlations in inverse kinematics, the observation of alpha clusters at the surface of heavy nuclei, as well as the observation of a correlated four-neutron state. The perspective for a precise determination of the neutron-neutron scattering length using the ${}^6\text{He}(p,p\alpha){}^2\text{n}$ reaction will be discussed as well.

Contact:
Caroline Hoffmann
Sekretariat Prof. Dr. Hans Jockers
Institut für Physik
choffman@uni-mainz.de

Sibylle Wittek
Sekretariat Prof. Dr. Concettina
Sfienti
Institut für Kernphysik
swittek@uni-mainz.de

