Cooled Ions and Explosive Nucleosynthesis: The Proton-Capture Campaign at the GSI Storage Rings

J. Glorius[1], C. Langer[2], Yu. A. Litvinov[1], and R. Reifarth[2]
for the NucAR[*] and SPARC[#] collaborations

[1]GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt, Germany
[2]Goethe Universität Frankfurt am Main, Frankfurt a. M., Germany
[*]Nuclear Astrophysics at Rings, http://exp-astro.de/nucar/
[#]Stored Particle Atomic Physics Collaboration, http://www.gsi.de/sparc

Explosive nucleosynthesis involves large nuclear reaction networks which evolve beyond nuclear stability. To address the scarce data situation in this domain, radioactive ion beams can be produced and made available for reaction studies in inverse kinematics. At GSI/FAIR the unique combination of the FRagment Separator FRS and the Experimental Storage Ring ESR makes it possible to store, decelerate and cool such ion beams. This technique allows the direct measurement of reaction cross sections inside the Gamow window as has been shown recently for proton-capture reactions [1].

This talk will give an overview on the past and recent developments at the GSI storage rings towards reaction studies at low energies. This includes the first steps with the pilot experiment on ^{96}Ru(p,γ) as well as the last beam time investigating ^{124}Xe(p,γ) at the ESR.

Finally, an extended outlook to future experiments at the new low-energy storage ring CRYRING will be given, which is perfectly suited for studies inside the Gamow window.

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