

FAKULTÄT für PHYSIK
LUDWIG-MAXIMILIANS-UNIVERSITÄT
MÜNCHEN/GARCHING

PHYSIK-DEPARTMENT
TECHNISCHE UNIVERSITÄT MÜNCHEN
MÜNCHEN/GARCHING

MLL-KOLLOQUIUM

Donnerstag, 19.11.2015, 16¹⁵ Uhr

Seminarraum 127, TUM, Physik II, Erdgeschoss/Nord
Treffen zum gemeinsamen Kaffee 16 Uhr

Dr. Dennis Mücher
(TU München)

The exotic side of CERN: physics of neutron-rich nuclei and impact on stellar nucleosynthesis

The science of stellar nucleosynthesis aims at understanding how the elements in the universe are formed in stars. On a microscopic scale, the formation of elements is dictated by the properties of atomic nuclei and their interactions. Our current understanding of nucleosynthesis largely relies on experimental data of short lived nuclear resonances or the properties of extremely exotic nuclei with a large excess of protons or neutrons. In this talk I will focus on two most recent examples.

The first topic addresses the fundamental question if and how harmonic oscillator shell closures change when adding neutrons to stable nuclei. The finding of a soft $N=2$ harmonic oscillator shell in the 'Island of Inversion' was the first discovery of changing shell structure in exotic nuclei and triggered a renaissance in our field thanks to the availability of intense beams of unstable ions. Recent experiments at the RIKEN Nishina Center (Japan) indicate that also the $N=3$ harmonic oscillator shell is softened for extremely neutron-rich nuclei, which would effect the r-process flow in a dramatic way. I will discuss the underlying physics and will report on our recent experiments at the radioactive ion beam facility ISOLDE at CERN using the high-granularity MINIBALL array. Using a most intense radioactive ^{72}Zn beam we were able to observe a surprising onset of deformation around the $N=3$ neutron harmonic oscillator shell closure. Part of this topic will also address our MINIBALL campaign at the MLL Tandem laboratory in 2013.

The second topic is related to the termination of the r-process path through nuclear fission when reaching heavy nuclei beyond ^{208}Pb . I will talk about our recent and future experiments at the RIKEN Nishina Center (Japan) which involve a new state of the art silicon detector, currently under development at the TU Munich and funded by the Excellence Cluster 'Origin and Structure of the Universe'.

gez. Peter Thierolf
Tel. 289-14064

gez. Norbert Kaiser
Tel. 289-12367