



独立行政法人理化学研究所 仁科加速器研究センター  
第177回 RIBF核物理セミナー

RIKEN Nishina Center for Accelerator Based Science  
The 177<sup>th</sup> RIBF Nuclear Physics Seminar

Constraining the EoS of neutron-rich matter by studying giant resonances

Prof. Attila Krasznahorkay

Institute for Nuclear Research, Hungarian Academy of Sciences (MTA-Atomki)

At the recent radioactive beam facilities an important issue is the size of the neutron skin of unstable nuclei. By measuring it precisely one may constrain the symmetry energy term of the nuclear equation of state (EoS). The precise knowledge of the symmetry energy is essential not only for describing the structure of neutron rich nuclei, but also for describing of the properties of the neutron-rich matter in nuclear astrophysics. After a short overview of the presently used methods I will present a novel method to determine the neutron-skin thickness of nuclei using the charge-exchange anti-analog giant dipole resonance (AGDR). Calculations have been performed using the relativistic proton-neutron quasiparticle random-phase approximation (pn-RQRPA). It is shown that the excitation energies of the AGDR, supplemented with the experimental values, provide a stringent constraint on value of the neutron-skin thickness. I will also give an overview of our recent experimental results obtained at GSI using relativistic heavy ion beams in inverse kinematic and also some results obtained in normal kinematics using the  $^{208}\text{Pb}(p,n\gamma p)^{207}\text{Pb}$  reaction. I will finish my talk by sketching our future plans at RIKEN for measuring neutron-skin thicknesses.

March 31 (Mon.) 2014 15:00 ~  
RIBF Hall (rm.201), RIBF bldg., RIKEN

Contact: Nuclear Physics Seminar Organizing Committee  
[npsoc@ribf.riken.jp](mailto:npsoc@ribf.riken.jp)  
<http://ribf.riken.jp/~seminar/>