



国立研究開発法人理化学研究所 仁科加速器研究センター
第263回 RIBF核物理セミナー
RIKEN Nishina Center for Accelerator Based Science
The 264th RIBF Nuclear Physics Seminar

Gamow-Teller giant resonance in ^{132}Sn

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In this seminar, the observation of the Gamow-Teller giant resonance (GTR) in ^{132}Sn will be reported. This mode of giant resonance is a unique phenomenon exhibited by nuclei, because the mode can be regarded as oscillations of nuclear wave functions in the spin and isospin space, while it is considered that the spatial part of the wave function is kept to be inert. Therefore, to my knowledge, such resonance has never been studied or even not considered for other many body systems. On top of this uniqueness, the excitation energy of a GTR, i.e. oscillation frequency, reflects the strength of a highly repulsive residual interaction that governs the behavior of the pion field in nuclear medium at a short range. As will be explained in the seminar, the evaluation of this interaction is crucial for estimating the critical density of the onset of pion condensation in nuclear medium and, therefore, for predictions of nuclear EOS, descriptions of neutron star structures, and so on. In this study, a key parameter representing the strength of this interaction, i.e., the so-called Landau-Migdal parameter g' , was extracted by measuring the double-differential cross sections for the (p,n) reaction at 216 MeV/u on a neutron-rich doubly magic unstable nucleus, ^{132}Sn with the quality comparable to data taken with stable nuclei. The present result accurately constrains the Landau-Migdal parameter as $g' = 0.68 \pm 0.07$, thanks to the high sensitivity of the GTR energy to g' . In combination with previous studies on the GTR for ^{90}Zr and ^{208}Pb , the result of this work shows the constancy of this parameter in the nuclear chart region with $(N-Z)/A = 0.11$ to 0.24 and $A = 90$ to 208.

* The talk will be given in English language.

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Jan.22nd(Tue.)2019 13:30~
RIBF Hall, RIBF bldg., RIKEN