



国立研究開発法人理化学研究所 仁科加速器科学研究センター  
第292回 RIBF核物理セミナー  
RIKEN Nishina Center for Accelerator Based Science  
The 292nd RIBF Nuclear Physics Seminar

## Swelling of Doubly Magic $^{48}\text{Ca}$ Core in Ca Isotopes beyond $N = 28$

Dr. Masaomi Tanaka  
(Kyushu University)

Interaction cross sections for Ca on a carbon target at 280 MeV/nucleon have been measured for the first time. The neutron number dependence of derived root-mean-square matter radii shows a significant increase beyond the neutron magic number  $N = 28$ . Furthermore, this enhancement of matter radii is much larger than that of the previously measured charge radii, indicating a novel growth in neutron skin thickness. A simple examination based on the Fermi-type distribution, and mean field calculations point out that this anomalous enhancement of the nuclear size beyond  $N = 28$  results from an enlargement of the core by a sudden increase in the surface diffuseness of the neutron density distribution, which implies the swelling of the bare  $^{48}\text{Ca}$  core in Ca isotopes beyond  $N = 28$ .

In this seminar, the evolution of nuclear radius of Ca isotopes will be presented in detail. Furthermore, the recent experimental and theoretical progress for nuclear matter and charge radii across the magic number will be also discussed.

### Reference

M. Tanaka, M. Takechi, A. Homma, M. Fukuda, D. Nishimura, T. Suzuki, Y. Tanaka, T. Moriguchi et al.,  
Phys. Rev. Lett. 124, 102501 (2020).

Feb. 9th (Tue.) 2021 13:30~  
via Zoom meeting system

\* The talk will be given in English language.

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