



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333回 RIBF核物理セミナー  
RIKEN Nishina Center for Accelerator Based Science  
The 333rd RIBF Nuclear Physics Seminar

## First observation of 280

Dr Yosuke Kondo

Nuclear shell structure characterized by magic numbers is a key to understanding atomic nuclei, consisting of strongly interacting many nucleons. The shell structure and magic numbers are well established for stable nuclei, while the magic numbers can change when the proton and neutron numbers are much different from the stable nuclei. It is thus quite important to identify which unstable nuclei show double magic characters. Based on the conventional magic numbers, there are only seven candidates for doubly magic unstable nuclei accessible with current technology:  $10\text{He}$ ,  $28\text{O}$ ,  $48\text{Ni}$ ,  $56\text{Ni}$ ,  $78\text{Ni}$ ,  $100\text{Sn}$ , and  $132\text{Sn}$ . Among them,  $28\text{O}$  ( $Z=8$ ,  $N=20$ ) is the only candidate yet to be observed. First observation has been succeeded at RIBF using the SAMURAI spectrometer. The  $28\text{O}$  nucleus was produced by one-proton removal reaction from  $29\text{F}$ , followed by decay via four neutron emission. A resonant peak of the  $28\text{O}$  ground state has been observed in its decay energy spectrum reconstructed by the invariant mass method from measured momentum vectors of decay products,  $24\text{O}$  and four neutrons. In the presentation, I will talk about the results on  $28\text{O}$  and its neighbor  $27\text{O}$ , published in *Nature* 620, 965 (2023).

Zoom link:

<https://riken-jp.zoom.us/j/96577967679?pwd=YmgrOW9pTmNhUklvODFycEdRSUUpuQT09>

Oct. 17<sup>th</sup>(Thu), 2024 13:30 ~  
via RIBF Hall



\* The talk will be given in English language.

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