

Direct mass measurement of proton-rich Fe isotopes

The two-proton radioactivity ($2p$ decay) is an exotic decay mode that was predicted theoretically in the 1960s and first discovered experimentally in 2002. Two protons are simultaneously emitted from the ground state of some neutron-deficient nuclei such as ^{19}Mg , ^{45}Fe , ^{48}Ni , and ^{54}Zn .

Because the two-proton emitters are very undatable, it is difficult to study their energy structure, and the mechanism of $2p$ decay is not fully established.

In this research, we performed the direct mass measurement of ^{45}Fe and the nucleus in its vicinity to reveal the energy structure and proton separation energy using the Tof-Brho method in the OEDO-SHARAQ beamline. We are aiming to evaluate the probability that two protons tunnel the potential barrier. The present status of the data analysis will be reported.

Primary author: HANAI, Shutaro (CNS, the university of Tokyo)

Co-authors: MICHIMASA, Shin'ichiro (Center for Nuclear Study, the Univ. of Tokyo); IMAI, Nobu (CNS); YOKOYAMA, Rin; SHARAQ13 COLLABORATION

Track Classification: Experimental Nuclear Physics: Low and Intermediate Energies