

The direct mass measurement of very proton-rich iron isotopes

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The two-proton radioactivity (2p decay) is an exotic decay mode 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 challenging 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. We are aiming to evaluate the probability that two-protons tunnel the potential barrier. The present status of the data analysis will be reported in the presentation.

Experimental study on nuclear physics

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