Two-proton Decays of the 17Ne Low-lying States

EURORIB'15

Monday, 8 June 2015 17:30 (20 minutes)

The structure of 17Ne nucleus is attracting a lot of interest for a long time. The multiple efforts to investigate it, both theoretical and experimental, have not yet provided convincing clarity about its properties. There are several questions of special interest connected with this nucleus which are actually tightly interwoven. One of them is two-proton decay of 17Ne first excited state. First excited state of 17Ne (3/2-) is located only 344 keV higher than 2p-decay threshold and it 2p-decay partial width is greatly lesser then gamma-decay partial width. Existing experimental threshold for the gamma-width/2p-width ratio 7.7e-3 [1] is few order of magnitude grater then theoretical predictions 0.9e-6 - 2.5e-6 [2].

In the recent experiment at the ACCULINNA fragment-separator [3] the two-proton decays of the low-lying states of 17Ne populated in the p(18Ne,d)17Ne transfer reaction were studied. Original method for registration of the 2p-decay events with a high sensitivity was used in the experiment. As a result the new threshold for gamma-width/2p-width ratio 1.3e-4 has been achieved. Details of data analysis and perspectives of the method will be reported.

References

- 1. M.J. Chromik et. al. PRC 55, 1676 (2002)
- 2. L.V. Grigorenko et. al. PRC 76 014008 (2007)
- 3. http://aculina.jinr.ru/

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Session Classification: At and beyond the dripline and new modes of radioactivity

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