

Two-proton Decays of the ^{17}Ne Low-lying States

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The structure of ^{17}Ne 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 ^{17}Ne first excited state. First excited state of ^{17}Ne ($3/2^-$) is located only 344 keV higher than 2p-decay threshold and its 2p-decay partial width is greatly lesser than gamma-decay partial width. Existing experimental threshold for the gamma-width/2p-width ratio 7.7×10^{-3} [1] is few orders of magnitude greater than theoretical predictions 0.9×10^{-6} - 2.5×10^{-6} [2].

In the recent experiment at the ACCULINNA fragment-separator [3] the two-proton decays of the low-lying states of ^{17}Ne populated in the $p(^{18}\text{Ne},d)^{17}\text{Ne}$ 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 1.3×10^{-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/>

Primary authors: Dr FOMICHEV, Andrey (JINR); Prof. TER-AKOPIAN, Gurgun (JINR); Dr GRIGORENKO, Leonid (JINR); Prof. GOLOVKOV, Mikhail (JINR); Mr SHAROV, Pavel (JINR)

Presenter: Mr SHAROV, Pavel (JINR)

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