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Beta-delayed neutron emission in the decay of 8He and 49K nuclei

Helium-8 is a nucleus with the largest neutron-to-proton ratio among all known nuclei. Therefore, studying this nucleus can provide valuable information concerning structure of neutron-rich nuclei.

Studies of beta decay of 8He [1,2,3] as well as 8He(p,n)8Li [4] reaction provided information about the decay scheme, especially about the strength of the Gamow-Teller transitions to 8Li states. However, those studies did not produce compatible results. One possible explanation states that during beta decay analysis, a complicated response function of neutron detector used was not taken into consideration, distorting the result.

Following that suspicion, another experiment has been conducted, aiming to remeasure energy spectrum of neutrons emitted as in the decay of 8He. The experimental setup used VANDLE spectrometer (Versatile Array of Neutron Detectors at Low Energies) [5], which measured neutron energy using time-of-flight technique.

This time, detector's response function was carefully studied by measuring energy spectrum of neutrons emitted from 49K –neutron-rich nucleus with a well known neutron energy spectrum [6]. As a secondary objective, studies of 49K decay itself were performed, including measurement of gamma spectrum.

In my talk I will focus mainly on 49K neutron measurements and establishing VANDLE's response function, which is currently used in ongoing 8He neutron spectrum analysis. Furthermore, 49K gamma spectrum was analyzed, resulting in finding two lines not seen before.

1. T. Björnstadt et al. , Nucl. Phys. A366 (1981) 461
2. M.J.G. Borge et al., Nucl. Phys. A460 (1986) 373
3. M.J.G. Borge et al., Nucl. Phys. A560 (1993) 664
4. M. Kobayashi et al., JPS Conf. Proc. 1 (2014) 013034
5. S.V. Paulauskas, PHD dissertation, University of Tennessee, (2013)
6. F. Perrot et al., Phys. Rev. C 74 (2006) 014313

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