Abstract for an Invited Paper for the DNP07 Meeting of The American Physical Society

Two-proton decay of 45Fe¹ ROBERT GRZYWACZ, University of Tennessee

The decay of the extremely neutron deficient ⁴⁵Fe is the the best candidate to study two proton radioactivity. This process was first predicted in 1960 by V.I. Goldansky to occur for only very few nuclei near the proton drip-line, for which the emission of the single proton is energetically forbidden, due to the pairing interaction. It was hypothesized, that the two protons will be emitted as a strongly correlated pair, a di-proton. Since then other scenarios have been predicted. The measurement of angular correlation between protons should provide an experimental signature for the nature of this process. In the recent experiment, performed at the NSCL at the Michigan State University, decay of ⁴⁵Fe has been studied in detail using a new type of gaseous detector developed at the Warsaw University. Two-proton radioactivity channel was clearly identified. The production rate of the ⁴⁵Fe nuclei was sufficient to measure enough events to determine the distribution of the angular correlations between the protons indicating a three-body character of this decay. Details of the experiment and the results will be presented.

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