

Beta-delayed charged-particle emission from Si-23

When approaching the proton drip-line, beta-delayed particle spectroscopy becomes a very important tool for understanding the structure of atomic nuclei. In fact, so far from the beta-stability line, particle emission from highly excited states in the daughter nuclei becomes extremely competitive to deexcitation via gamma emission, since the Q-value gets large.

Neutron-deficient silicon isotopes were investigated in an experiment performed at the MARS spectrometer at the Cyclotron Institute, Texas A&M University, with the aim of verifying the branching ratios for the known decay channels (beta-delayed one- and two-proton emission) and of identifying new ones, since the energy windows for beta-delayed proton+alpha and three-proton emission are open. The silicon ions were implanted into the Warsaw Optical Time Projection Chamber [1], where they decayed. The detector is particularly well suited for such studies, since it allows detection of these exotic decay modes with efficiency close to 100%. The preliminary results of the analysis of the beta decay of Si-23 will be presented.

[1] M. Pomorski et al., Phys. Rev. C 83, 014306(R) (2011)

Primary author: CIEMNY, A. A. (University of Warsaw, Faculty of Physics)

Co-authors: FIJALKOWSKA, A. (Department of Physics and Astronomy Rutgers, The State University of New Jersey, USA); SAASTAMOINEN, A. (Texas A&M University, College Station, TX, USA); ROEDER, B. T. (Texas A&M University, College Station, TX, USA); HUNT, C. (Texas A&M University, College Station, TX, USA); MAZZOCCHI, C. (Faculty of Physics, University of Warsaw, Poland); KAMINSKI, G. (Joint Institute for Nuclear Research, Dubna, Russia); ROGACHEV, G. (Texas A&M University, College Station, TX, USA); JAYATISSA, H. (Texas A&M University, College Station, TX, USA); HOOKER, J. (Texas A&M University, College Station, TX, USA); JANIAK, L. (Faculty of Physics, University of Warsaw, Poland); PFÜTZNER, M. (Faculty of Physics, University of Warsaw, Poland); POMORSKI, M. (Faculty of Physics, University of Warsaw, Poland); SOKOLOWSKA, N. (Faculty of Physics, University of Warsaw, Poland); SHARMA, S. (Faculty of Physics, University of Warsaw, Poland); DOMINIK, W. (Faculty of Physics, University of Warsaw, Poland); KOSHCHIY, Y. (Texas A&M University, College Station, TX, USA)

Presenter: CIEMNY, A. A. (University of Warsaw, Faculty of Physics)

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