Abstract Submitted
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Beta-Delayed Proton- and Gamma-Decay of ^{27}P for Nuclear Astrophysics[1] E. SIMMONS, L. TRACHE, A. BANU, M. MCCLESKEY, B. ROEDER, A. SPIRIDON, R.E. TRIBBLE, Cyclotron Institute, Texas A&M University, Texas, United States, T. DAVINSON, P.J. WOODS, G.J. LOTAY, J. WALLACE, D. DOHERTY, School of Physics, University of Edinburgh, Edinburgh, United Kingdom, A. SAASTAMOINEN, Department of Physics, University of Jyvaskyla, Finland — The creation site of cosmic ^{26}Al is still under debate. It is thought to be produced in hydrogen burning and in explosive helium burning in novae and supernovae, and possibly also in the H-burning in outer shells of red giant stars. Also, the reactions for its creation or destruction are not completely known. When ^{26}Al is created in novae, the reaction chain is: ^{24}Mg(p,γ)^{25}Al($\beta+\nu$)^{25}Mg(p,γ)^{26}Al, but it can be by-passed by another chain: ^{25}Al(p,γ)^{26}Si(p,γ)^{27}P and it can also be destroyed directly. The reaction ^{26m}Al(p,γ)^{27}Si* is another avenue to bypass the production of ^{26}Al and is dominated by resonant capture. We study these resonances by an indirect method, through the β-decay of ^{27}P. We use ^{27}P produced and separated with MARS and a setup which allows increased efficiency for low energy protons and for high-energy gamma-rays. We measure gamma-rays and β-delayed protons emitted from states above the proton threshold in the daughter nucleus ^{27}Si (S_p = 7.463 MeV) to identify and characterize the resonances. Its lifetime was also measured with accuracy under 1%.

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