Abstract Submitted
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Beta-delayed neutron spectroscopy using an ion trap[1] R.M. YEE, UC Berkeley/LLNL, N.D. SCIELZO, LLNL, S. CALDWELL, U. Chicago/ANL, J.A. CLARK, J.P. GREENE, ANL, D. LASCAR, Northwestern U., A.F. LEVAND, ANL, G. LI, McGill U./ANL, E.B. NORMAN, UC Berkeley, S. PADGETT, M. PEDRETTI, LLNL, A. PEREZ-GALVAN, ANL, G. SAVARD, U. Chicago/ANL, R.E. SEGEL, Northwestern U., K.S. SHARMA, U. Manitoba, M.G. STERNBERG, J. VAN SCHELT, U. Chicago/ANL, B.J. ZABRANSKY, ANL — Beta-delayed neutron emission is of interest to both pure and applied nuclear physics communities. For example, branching ratios are needed to determine how the short-lived neutron-rich isotopes synthesized in the astrophysical r-process decay back to stability. Also, neutron energy spectra are required for the design of nuclear reactors. Reliable measurements of beta-delayed neutron properties can be performed with high precision using a combination of sophisticated ion-trapping techniques and modern radiation-detection systems. When a radioactive ion decays in the trap, the recoil-daughter nucleus and emitted particles emerge from the <1 mm^3 trap volume with minimal scattering and propagate unobstructed through vacuum. These properties allow the momentum and energy of the emitted neutron to be precisely reconstructed from the nuclear recoil. Spectroscopy of beta-delayed neutrons can be performed with high efficiency and energy resolutions approaching 3%. The current status of a campaign to measure delayed neutron properties of interest to nuclear reactors and r-process nucleosynthesis will be discussed.

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