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Beta-delayed neutron spectroscopy with trapped ions[1] N.D. SCIELZO, S. PADGETT, M. PEDRETTI, LLNL, R.M. YEE, E.B. NORMAN, LLNL, UC Berkeley, P.F. BERTONE, J.A. CLARK, J.P. GREENE, A. PEREZ GALVAN, A.F. LEVAND, B.J. ZABRANSKY, ANL, S.A. CALDWELL, G. SAVARD, M.G. STERNBERG, J. VAN SCHELT, ANL, UChicago, D. LASCAR, R.E. SEGEL, ANL, Northwestern U., F. BUCHINGER, S. GULICK, G. LI, McGill U., C.M. DEIBEL, LSU, K.S. SHARMA, U. Manitoba — Neutrons emitted following the beta decay of fission fragments play an important role in many fields of basic and applied science such as nuclear energy, nuclear astrophysics, and stockpile stewardship. Radioactive ions held in an ion trap are an appealing source of activity for improved studies of this decay process. When a radioactive ion decays in the trap, the recoiling daughter nucleus and emitted radiation emerge from the $\sim$1 mm^3 trap volume and propagate through vacuum with negligible scattering. For the first time, beta-delayed neutron spectroscopy is being performed by identifying neutron emission from the large nuclear recoil it imparts and using this recoil energy to reconstruct the neutron branching ratios and energy spectra. Results from a recent proof-of-principle measurement and plans for future experiments at Argonne National Laboratory using significantly higher intensity fission-fragment beams will be presented.

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