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Fission Fragment Spectroscopy Using a Frisch-Gridded Chamber in RPI's Lead Slowing-Down Spectrometer CATHERINE ROMANO, Rensselaer Polytechnic Institute — A double sided Frisch-gridded fission chamber for use in RPI's Lead Slowing-Down Spectrometer (LSDS) is being developed at Rensselaer Polytechnic Institute. Placing this fission chamber in the high neutron flux of the LSDS allows measurements of neutron induced fission cross sections, as well as the mass and kinetic energy of the fission fragments of various isotopes. The fission chamber consists of two anodes shielded by Frisch grids on either side of a single cathode. The sample is deposited on a thin polyimide film located in the center of the cathode. Samples are made by dissolving small amounts of actinides in solution, placing the solution on the films and allowing the solution to evaporate. The anode signal and the sum of the anode and grid signals are collected by the data acquisition system. These values are used to calculate the angle of emission of the fission fragments which is then used to determine their energies and masses. RPI's LSDS is a 75 ton, 1.8m cube of lead. The RPI 60MeV Linac creates neutrons through a (γ,n) reaction when the electrons interact with a tantalum target inside the lead spectrometer. The resulting neutron flux is about 4 orders of magnitude larger than an equivalent resolution time-of-flight experiment. The high neutron flux allows for the measurement of isotopes that are not available in large quantities (sub-micrograms) or with small fission cross sections (microbarns). In collaboration with Ezekiel Blain, Zack Goldstein, Yaron Danon and Robert Block at Rensselaer Polytechnic Institute. Funded by Stewardship Science Academic Alliance, National Nuclear Security Agency.

Catherine Romano
Rensselaer Polytechnic Institute

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