

Abstract Submitted
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Preliminary Results from the Triple Fission-Ejecta Correlations Trial (TRIFECTA) at ORNL¹ WILLIAM PETERS, Univ. of Tennessee ORNL, M. S. SMITH, A. GALINDO-URIBARRI, ORNL, E. TEMANSON, Univ. of Wisconsin La-Crosse, K. SMITH, S. V. PAULASKAS, C. THORNSBERRY, K. L. JONES, R. GRZYWACZ, Univ. of Tennessee, J. A. CIZEWSKI, Rutgers — Despite fission having been studied for almost 80 years, there is a shortage of data on the correlations of multiple fission products needed to benchmark advanced theoretical models of fission. A pioneering experiment underway at ORNL, the Triple Fission-Ejecta Correlations Trial (TRIFECTA), involves the measurement of energy and angular correlations between prompt ²⁵²Cf fission neutrons and gamma rays with respect to one fission fragment in time-coincidence. The mass of one fragment is determined, with 4 amu precision, by using 2 micro-channel plate timing detectors and a silicon total-energy detector. Time-coincident data from auxiliary detectors are also recorded: 6 NaI detectors to measure gamma-ray multiplicity, 1 HPGe detector to measure the high-resolution gamma-ray spectrum, and an array of 28 VANDLE modules to measure the neutron spectrum and multiplicity. For the first time, correlations between coincident fragment – gamma – neutron fission products can be studied, as a function of fragment mass. Utilizing certain unique gamma-ray transitions recorded by the HPGe detector, we were able to determine the neutron energy and angular correlations of specific fission fragments. Preliminary results on neutron – neutron angular correlations, gamma-ray vs. neutron multiplicity, and other correlations will be presented, along with plans for future improvements.

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