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Measuring ^{19}F(α,n) with VANDLE for Nuclear Safeguards[1]
WILLIAM PETERS, Univ. of Tenn. & ORNL, R.C.C. CLEMENT, US Air Force, M.S. SMITH, S.D. PAIN, ORNL, S. THOMPSON, Idaho Nat. lab, J.A. CIZEWSKI, C. REINGOLD, B. MANNING, S. BURCHER, Rutgers, D.W. BARDAYAN, W.-P. TAN, E. STECH, M.K. SMITH, K. SMITH, R. AVETISYAN, A. LONG, A. BATTAGLIA, S. MARLEY, A. GYURJINYAN, Notre Dame, S. ILYUSHKIN, P.D. O'MALLEY, Col. Sch. of Mines, M. MADURGA, S.V. PAULAUSKAS, S. TAYLOR, Univ. of Tenn., M. FEBBRARO, Univ. of Mich. — UF_6 is used in many parts of the Uranium Fuel Cycle, and various techniques are used by nonproliferation agencies to monitor and account for the material. One of the most promising non-destructive assay (NDA) methods consists of measuring gross neutron rates induced by uranium-decay alpha particles reacting with the fluorine and emitting a neutron. This method, however, currently lacks reliable nuclear data on the ^{19}F(α,n) reaction cross section to determine an accurate neutron yield rate for a given sample of UF_6. We have used the Versatile Array of Neutron Detectors at Low Energy (VANDLE) to measure the cross section and coincident neutron spectrum over an energy range pertinent to NDA in a two part experiment: First at Notre Dame with a LaF_3 target and a pulsed alpha-particle beam, and second at ORNL with a windowless He-gas target and a ^{19}F beam. The motivation for this measurement and preliminary results will be presented.

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William Peters
Univ. of Tenn. & ORNL

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