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Observation of the n(^{3}He,t)p Reaction by Detection of Far-Ultraviolet Radiation CHARLES W. CLARK, Joint Quantum Institute, NIST and the University of Maryland, ALAN K. THOMPSON, National Institute of Standards and Technology, MICHAEL A. COPLAN, JOHN W. COOPER, Institute for Physical Science and Technology, University of Maryland, PATRICK HUGHES, Department of Physics, University of Maryland, ROBERT E. VEST, Electron and Optical Physics Division, National Institute of Standards and Technology — We have detected Lyman alpha radiation as a product of the n(^{3}He,t)p nuclear reaction, induced in a ^{3}He gas cell irradiated by a cold neutron beam at the NIST Center for Neutron Research. The predominant source of this radiation appears to be decay of the 2p state of tritium produced by charge transfer and excitation collisions with the background ^{3}He gas. For atmospheric pressure and room temperature in the ^{3}He cell, we find yields of tens of Lyman alpha photons for every neutron reaction. These results suggest a method of cold neutron detection that is complementary to existing technologies that use proportional counters. In particular, this approach may provide single neutron sensitivity with wide dynamic range capability, and a class of neutron detectors that are compact and operate at relatively low voltages.

Charles W. Clark
National Institute of Standards and Technology

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