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Observation of far-ultraviolet signatures of the ^{3}He(n,tp) reaction PATRICK P. HUGHES, National Institute of Standards and Technology , MICHAEL A. COPLAN, University of Maryland, ALAN K. THOMPSON, MUHAMMAD ARIF, ROBERT E. VEST, National Institute of Standards and Technology, CHARLES W. CLARK, Joint Quantum Institute, National Institute of Standards and Technology and University of Maryland, LAND TEAM — In previous work [1] on the production of Lyman α radiation in the the ^{3}He(n,tp) reaction in a cell of ^{3}He gas at atmospheric pressure, we found that ≈ 50 Lyman α photons were produced per absorbed neutron. These photons are produced by excited states of T and H created by charge-exchange and excitation collisions of t and p with the background gas [2]. This provides a method of neutron detection with intrinsic discrimination against gamma rays. We are now conducting studies of far-ultraviolet emission in ^{3}He mixtures with other gases, e.g. ^{4}He, N_2, Ne, Ar, Kr, and Xe. The heavier noble gases amplify by factors of over 100 the signals seen in pure ^{3}He. The results suggest the possibility of an efficient optical neutron detector with improved economy of use of ^{3}He.

[1] A. K. Thompson, *et al.*, *J. Res. Nat. Inst. Standards Tech.* **113**, 69 (2008)
[2] J. W. Cooper, *et al.*, *J. Res. Nat. Inst. Standards Tech.* **114**, 185 (2009)

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