Abstract Submitted
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Attosecond dissociation of the HT molecule from the He united-atom limit CHARLES W. CLARK[1], ALAN K. THOMPSON, National Institute of Standards and Technology, MICHAEL A. COPLAN, JOHN W. COOPER, PATRICK HUGHES, University of Maryland, ROBERT E. VEST, National Institute of Standards and Technology, LYMAN ALPHA NEUTRON DETECTOR (LAND) TEAM — From an AMO perspective, the $n + {}^3He \rightarrow t + p + 764$ keV nuclear reaction can be viewed as unimolecular dissociation of the HT molecule proceeding from the ^{4}He united-atom limit. The speeds of the electrons in the ground state of He are comparable to those of the triton and proton fragments, thus fulfilling the Massey criterion which is conducive to subsequent charge-transfer and excitation collisions between the heavy fragments and ambient ^{3}He. We have measured Lyman α radiation produced in a ^{3}He gas cell irradiated by a cold neutron beam at the NIST Center for Neutron Research. For atmospheric pressure and room temperature in the cell, we find yields of tens of Lyman α photons for every neutron reaction [arXiv:0801.2614]. These results suggest a method of cold neutron detection by optical means that is complementary to existing proportional counter technologies, and offers greater sensitivity, wider dynamic range, suppression of background, and simpler manufacturability.

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