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Direct search for the thorium-229 nuclear isomeric transition with a pulsed VUV laser RICKY ELWELL, JUSTIN JEET, CHRISTIAN SCHNEIDER, University of California, Los Angeles, EUGENE TKALYA, Lomonosov Moscow State University and Nuclear Safety Institute of Russian Academy of Science, ERIC HUDSON, University of California, Los Angeles — The nucleus of ^{229}Th has an exceptionally low-energy isomeric transition in the vacuum-ultraviolet (VUV) spectrum around 7.8 ± 0.5 eV [1]. While inaccessible to standard nuclear physics techniques, there are various prospects for a laser-accessible nuclear transition. Our direct search for the transition uses thorium-doped crystals as samples. In a previous experiment [2] at the Advanced Light Source (ALS) synchrotron, LBNL, we were able to exclude a large portion of the transition lifetime-vs.-frequency region-of-interest (ROI) [3]. Here, we will report on our ongoing efforts of a search using a pulsed VUV laser system as light source, which allows us to enhance our sensitivity up to $10^4\times$ over the ALS and extend the accessible frequency range over the entire ROI [3]. An updated exclusion region will be presented.

[1] B. R. Beck et al.: LLNL-PROC-415170 (2009)
[2] J. Jeet et al.: Phys. Rev. Lett. 114, 253001 (2015)
[3] E. V. Tkalya et al.: Phys. Rev. C 92, 054324 (2015)

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