Abstract Submitted
for the DAMOP15 Meeting of
The American Physical Society

Results of a direct search for the thorium-229 nuclear isomeric transition CHRISTIAN SCHNEIDER, JUSTIN JEET, SCOTT T. SULLIVAN, WADE G. RELLERGERT, University of California, Los Angeles, SAED MIRZADEH, Oak Ridge National Laboratory, A. CASSANHO, H.P. JENSSEN, AC Materials, Inc., EUGENE V. TKALYA, Lomonosov Moscow State University and Nuclear Safety Institute of Russian Academy of Science, ERIC R. HUDSON, University of California, Los Angeles — The nucleus of thorium-229 has an exceptionally low-energy isomeric transition in the vacuum-ultraviolet spectrum around 7.8 ± 0.5eV [1]. The prospects of a laser-accessible nuclear transition are manifold but require spectroscopically resolving the transition. Our approach is a direct search using thorium-doped crystals as samples and exciting the isomeric state with vacuum-ultraviolet synchrotron radiation [2]. In a recent experiment, we were able to search for the transition at the Advanced Light Source synchrotron, LBNL, between 7.3eV and 8.8eV. We found no evidence for the transition within a lifetime range of 1–2s to 2000–5600s [3]. This result excludes large parts of the theoretically expected region. We conclude reporting on our efforts of a search using laser-generated vacuum-ultraviolet light.

[1] B. R. Beck et al.: LLNL-PROC-415170 (2009)
[2] W. G. Rellergert et al.: Phys. Rev. Lett. 104, 200802 (2010)
[3] J. Jeet et al.: arXiv 1502.02189 (2015)

Christian Schneider
University of California, Los Angeles

Date submitted: 16 Apr 2015 Electronic form version 1.4