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Determination of the ^{229}Th isomer half-life JASON BURKE, BRET BECK, JOHN BECKER, MICHAEL HAYDELL, RICK NORMAN, NICHOLAS SCIELZO, STEVEN SHEETS, ERIK SWANBERG, Lawrence Livermore National Laboratory — Recently there has been renewed interest in studying the nuclear properties of the ^{229}Th isomer. ^{229}Th has the lowest known isomer at 7.6 eV [1]. Direct laser manipulation of the ground and first excited states could lead to the realization of the world's first nuclear clock. To understand the linewidth of the isomeric state we are conducting experiments to directly observe the half-life of the isomer decay. We use a novel "hot-atom" technique in which we catch the recoiling ^{229}Th nuclei following the alpha decay of ^{233}U $\Rightarrow$ ^{229}Th + α. On average 2% of the ^{229}Th populate the isomeric 3/2+ state compared to the 5/2+ ground state. Recoils are collected on various catcher plate materials, rotated in vacuum in front of an einzel lense and multi-channel plate detector. The internal conversion electrons are counted as a function of time to determine the half-life. Varying the catcher plate material we can investigate the effect that the materials have on the half-life. Determination of the half-life we will provide valuable guidance to Th trapping research [2]. 1) Beck et al., PRL 98, 142501 (2007) 2) Campbell et al., PRL 102, 233004 (2009) This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.

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