

Abstract Submitted  
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**Precise Measurement of the Positron Asymmetry in the Decay of Spin-polarized  $^{37}\text{K}$** <sup>1</sup> BENJAMIN FENKER, DAN MELCONIAN, SPENCER BEHLING, MICHAEL MEHLMAN, Texas A & M University, JOHN BEHR, IOANA CRAICIU, ALEXANDRE GORELOV, JAMES MCNEIL, SCOTT SMALE, CLAIRE WARNER, TRIUMF, MELISSA ANHOLM, GERALD GWINNER, University of Manitoba, DANIEL ASHERY, IULIANA COHEN, Tel Aviv University — Precise low-energy measurements in nuclear  $\beta$ -decay provide constraints on possible physics beyond the standard model complementary to high-energy collider experiments. We report the most precise measurement of the positron asymmetry from a polarized nucleus to-date. At the TRIUMF Neutral Atom Trap, atoms of the positron emitter  $^{37}\text{K}$  are confined in an alternating-current magneto-optical trap and spin-polarized to  $99.13 \pm 0.09\%$  via optical pumping. The use of atom-trapping techniques allows for an exceptionally open geometry with the decay products escaping the trapping region unperturbed by the trapping potential. We detect the emitted positrons in a pair of symmetric detectors placed along the polarization axis to measure the asymmetry *in situ*. The analysis was performed blind and considers  $\beta$ -scattering and other systematic effects. The results place limits on the mass of a hypothetical  $W$  boson coupling to right-handed neutrinos as well as contribute to an independent determination of the  $V_{ud}$  element of the CKM matrix.

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