

Abstract Submitted  
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**Experimental tests of isospin symmetry breaking in superallowed beta decay** VICTOR IACOB, Texas AM University — In the search for physics beyond the standard model, the unitarity test of the Cabibbo-Kobayashi-Maskawa (CKM) matrix is one of the most demanding. Superallowed  $\beta$  transitions between  $J^\pi = 0^+, T = 1$  analog states currently provide the most precise value for  $V_{ud}$ , the up-down quark mixing element of the CKM-matrix. Since no axial current can contribute in first order to these transitions, they give a direct access to the vector coupling constant  $G_V$  of the weak interaction. The current value of  $V_{ud}$  is  $\pm 0.03\%$  accurate [1] and is obtained from fifteen  $ft$ -values for superallowed  $\beta$  decays, all measured with a precision of 0.3% or better. There are four small theoretical corrections (all of the order of 1%) required in the  $V_{ud}$  extraction. The current result's error is dominated by these theoretical corrections. From the experimentalist's perspective, precision can be further improved by testing the reliability of the predicted corrections. A powerful experimental test comes from measurements of mirror pair superallowed transitions [1,2] In these transitions the predicted corrections are relatively large and the ratio of their  $ft$ -values is very sensitive to the model calculation of the isospin-symmetry-breaking corrections  $\delta_{NS}$  and  $\delta_C$ . The talk will focus on the experimental effort required, exemplifying with the mirror pair of superallowed  $0^+ \rightarrow 0^+ \beta$  transitions  $^{34}\text{Ar} \rightarrow ^{34}\text{Cl}$  and  $^{34}\text{Cl} \rightarrow ^{34}\text{S}$ . [1] J. J. C. Hardy and I. S. Towner, Phys. Rev. C **102**, 045501 (2020) [2] V.E. Iacob *et al.* Phys. Rev. C **101**, 045501 (2020)

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