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**Precision half-life measurement of 17F** CATHERINE NICOLOFF, Wellesley College and University of Notre Dame, TWINSOL COLLABORATION
— Precision measurements in low energy nuclear physics have led to considerable advances in the topic of fundamental symmetry. Efforts to improve the precision and accuracy of branching ratios, half-lives, and Q-values of superallowed $0^+ \rightarrow 0^+$ pure Fermi $\beta$-decays have led to what is now the most stringent test of the unitarity of the CKM matrix and the standard model of electroweak interactions. One of the critical elements in this unitarity test is $V_{ud}$, which currently comes from 14 corrected $Ft$-values of superallowed $0^+ \rightarrow 0^+$ pure Fermi $\beta$-decays. Despite the great precision achieved from pure Fermi transitions, measurements in other systems, such as superallowed $0^+ \rightarrow 0^+$ mixed Fermi decays, remain important. Among the mirror transitions, an excellent candidate for measurement is $^{17}$F. This transition proceeds from the ground state directly to the ground state of the daughter nucleus, eliminating the need to measure the branching ratios. Since its measured lifetime is currently less precise than its measured Q-value, we performed a precision half-life measurement of $^{17}$F at the Nuclear Science Laboratory of the University of Notre Dame.

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