

Abstract Submitted  
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**Precision experiments to test the Standard Model at the University of Notre Dame**<sup>1</sup> MAXIME BRODEUR<sup>2</sup>, Notre Dame — The Standard Model of Physics as a description of matter in the universe contains many unexplained features. One way to search for physics beyond the Standard Model (SM) is accomplished by testing the unitarity of the Cabibbo-Kobayashi-Maskawa matrix. Such a unitarity test requires a precise and accurate determination of the  $V_{ud}$  matrix element, which is currently achieved via the precise determination of the comparative half-life of superallowed beta decays. While  $V_{ud}$  is currently determined mostly from an ensemble of precise experimental quantities of superallowed pure Fermi transitions, there is currently a growing interest in obtaining  $V_{ud}$  from superallowed mixed transitions to test the accuracy of  $V_{ud}$  and the calculation of the isospin symmetry breaking theoretical correction. In the past year our group has performed several half-life measurements of mirror decay transitions using radioactive ion beams produced by the TwinSol facility of the Nuclear Science Laboratory of Notre Dame. In the future we also plan on building an ion trapping system to measure the Fermi to Gamow-Teller mixing ratio in many mirror decays for the first time.

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