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Beta-decay from ^{47}K to ^{47}Ca with GRIFFIN

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Recent developments in many-body calculation methods have extended the application of *ab initio* interactions to medium-mass nuclei near closed shells. Detailed nuclear data from these isotopes are necessary to evaluate the many-body calculation methods and to test the predictive capacity of the interactions. ^{47}Ca and ^{47}K are each one nucleon removed from the doubly-magic nucleus ^{48}Ca . The beta-decay from ^{47}K to ^{47}Ca has a reported half-life of 17.5 s and a $Q(\beta^-)$ value of 6643 keV. Transfer reactions from ^{48}Ca have identified excited states of ^{47}Ca throughout the available range of beta-decay Q -values, but the two published measurements of ^{47}Ca populated by the beta-decay of ^{47}K have only identified four states directly populated by beta decay. High-statistics beta-decay studies using modern high-efficiency, high-granularity detection systems can provide detailed information on level energies, beta-decay and gamma-ray branching ratios, as well as spin/parity assignments and transition mixing ratios through gamma-ray angular correlations.

A recent experiment at TRIUMF-ISAC used the GRIFFIN spectrometer to investigate the levels populated by beta decay in more detail. A beam of surface-ionized ^{47}K was provided by the TRIUMF-ISAC facility and implanted onto a mylar tape at the focus of the GRIFFIN spectrometer, where it decayed to ^{47}Ca . The early implementation of the GRIFFIN spectrometer used in this experiment consisted of 15 close-packed HPGe clovers with 19% absolute full-photopeak efficiency for 1 MeV gamma rays. Beta detection was provided by ten of the plastic scintillators of SCEPTAR and internal electron conversion spectroscopy was possible with the five lithium-drifted silicon detectors of PACES. The intensity of the beam and the efficiency of the GRIFFIN spectrometer allow for the detection of gamma-ray transitions with small branching ratios, enabling the list of states populated by beta decay to be extended from previous publications. In addition, angular correlations between cascading gamma rays provide information about the spins and parities of states that are not currently included in the beta-decay level scheme. An overview of the experimental apparatus as well as a discussion of the results from preliminary analysis will be presented.

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