

Abstract Submitted  
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**Electron energy response of the NIST RDKII spectrometer and studies of the Fierz interference** MATTHEW BALES<sup>1</sup>, University of Michigan, RDK - RADIATIVE NEUTRON DECAY COLLABORATION — In the beta-decay of neutrons and nuclei, non V-A interactions may introduce an electron energy dependence into the decay rate through the Fierz coefficient  $b$ , characterizing interference of S-V and/or T-A amplitudes. Experimental limits have been put on the  $b$ -coefficient in nuclear systems but not yet in free neutron decay. This has been due to difficulties both in producing free neutrons in a low background environment and in isolating the energy dependence of any instrumental response. We have undertaken an analysis of the electron energy spectrum using data from a radiative neutron decay experiment, RDKII, which utilized a cold neutron beam-line at NIST, Gaithersburg, Maryland. In the experiment, charged particles from neutron decay are transported towards a silicon surface barrier detector using magnetic and electric fields. We have employed direct calibration with electron sources and Monte Carlo simulations such as Geant4 and MCNP5 in order to understand the detector's response function and to evaluate the effects of charged particle transport on the spectra observed. We present our current methodologies, progress, and potential capabilities in determining a Fierz interference term for free neutron decay.

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