

Abstract Submitted  
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**Calibrating the Photon Detector for an Experiment Measuring Radiative Decay of the Neutron** ROBERT COOPER, Sandia National Laboratory, RDK II COLLABORATION — Data acquisition has been completed on an experiment to measure the radiative decay mode of the neutron by registering the correlated proton, electron, and photon decay products. This experiment anticipates measuring the branching ratio and the photon energy spectrum to an uncertainty of 1%. To achieve this precision, the photon detector solid angle coverage was increased by a factor of 12. The detector consists of 12 bismuth germanate scintillating crystals coupled to avalanche photodiodes, and it operates in the cryogenic, high magnetic field environment of a superconducting solenoid. In the initial experiment, the dominant systematic uncertainty was photon detector resolution and gain drift, and to reduce this uncertainty a detailed calibration program was implemented. The background gamma ray spectrum was periodically measured to monitor for possible gain shifts during the run. Radioisotope calibrations were also performed to quantify the detector gain, efficiency, spatial dependence, and resolution. We present the details of these calibrations and describe the simulations used to interpret these data.

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