Abstract Submitted
for the APR10 Meeting of
The American Physical Society

A Study of Multi-Shower Discrimination in the New Muon $(g-2)$ **Calorimeter** EMIL FRLEZ, University of Virginia, NEW (G-2) COLLABORATION — We have used a GEANT3 simulation of the New Muon $(g-2)$ Calorimeter to study discrimination between single e^+ and double e^+ electromagnetic showers. The calorimeter was defined as a $20 \times 16 \times 16$RL cm^3 box with alternating layers of plastic scintillator and tungsten. Assumed energy resolution was matched to the measured resolution of a detector prototype. An artificial neural network algorithm (ANN) was trained to discriminate between a single positron shower and the background events. The five ANN input variables were: (1) maximum energy deposited in the single module $E_{\rm M}$, (2) module index with maximum energy deposition $i_{\rm M}$, (3) energy deposition $E_{\rm R1}$ in the ring of modules around $i_{\rm M}$, (4) energy deposition $E_{\rm R2}$ in the next-to-nearest-neighbors around $i_{\rm M}$, and (5) outer energy sum $E_{\rm OUT}$. The efficiency of the ANN algorithm in recognizing a single e^+ signal while suppressing false positives (two e^+'s misidentified as a single) was studied as a function of energy and the calorimeter segmentation. The results were used as an input design parameter for the 2D tracking calorimeter hodoscope.

Emil Frlez
University of Virginia

Date submitted: 22 Oct 2009 Electronic form version 1.4