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Mapping the Gain Stability of Multi-Pixel Photon Counters for the Muon g-2 Calorimeters KAZIMIR WALL, University of Washington, MUON G-2 COLLABORATION — The Fermilab Muon g-2 collaboration identified Hamamatsu Multi-Pixel Photon Counters (MPPCs, or SiPMs) as an excellent candidate for the PbF_2 calorimeter light readout. These devices are new to particle physics and the University of Washington Muon Group is evaluating them extensively. To be selected for the g-2 experiment the MPPCs must pass stringent gain stability requirements. For events where particles arrive close in time the detector exhibits a decrease in gain for the second particle. This effect is due to the inherent pixel recovery time of the MPPC. It is deterministic and can be corrected for. The work presented here is a study of the gain decrease of the second particle to be used as a systematic correction. In the laboratory, the two-pulse effect is simulated by splitting the output of a 407nm pulsed diode laser into two channels. One of these channels is then delayed by a variable amount in the range of 5ns to 160ns. The output of the SiPM is digitized using a DRS4 chip developed at PSI, Switzerland. By observing the two pulses independently as well as together the gain change on the second pulse can be mapped. The quantified result is the function G2(Δt, E_1, E_2) where Δt is the difference in time of the two pulses and E_i is the energy of the i^{th} pulse.

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