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Cosmogenic muons in the CCM experiment at LANL

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Coherent CAPTAIN-Mills (CCM) is a 10 ton liquid argon scintillation detector at Los Alamos National Laboratory for the study of neutrino and beyond Standard Model physics. It is located 23 m from the stopped pion source of the Lujan Facility, and will receive 1.5×10^{22} POT in its ongoing 3-year run cycle. CCM is instrumented with 200 8-inch PMTs, of which 80% are coated with wavelength shifting tetraphenyl-butadiene, and 40 1-inch veto PMTs in an optically isolated veto. Cosmogenic muons provide a means of calibrating the detector in the energy range from 100 to 600 MeV of deposited energy. Simulations of the cosmogenic flux can provide important insights as to the overall detector response. In this poster, we present progress towards the development of a calibration based on the predicted shape and rate of the muon spectrum at CCM. We also address the role of Michels electrons, which produce signals in the 10 to 60 MeV energy range. Using a similar strategy as for muons, we aim to model the detector response in this lower energy regime. Finally, some prospects of the experiment's physics reach are also presented.

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