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Simulations toward Effective Calibrations of the CUORE Detector[1] BYRON DANIEL, Yale University, CUORE COLLABORATION — It is currently unknown whether or not the neutrino is a Majorana or Dirac particle, that is, whether or not the neutrino is its own antiparticle. Observing neutrinoless double-beta decay, a process only possible if neutrinos are Majorana particles, can answer this question. If observed, this process would indicate that Lepton number is not conserved. CUORE's (Cryogenic Underground Observatory for Rare Events) is a bolometer based detector with $Te0_2$ crystal bolometers that is used to search for neutrinoless double-beta decay in ^{130}Te. To insure that this detector will identify the energy peaks resulting from neutrinoless double-beta decay precisely, the detectors must be calibrated with gamma sources. To calibrate the detector, twelve strings carrying the calibration source ^{232}Th were cooled from 300K to 10mK and installed within and around the bolometer towers. Six strings are distributed around the outside of the towers, and six strings are among the towers. This organization of strings was chosen because the gamma ray radiation from the source strings cannot penetrate more than one or two crystals at low energy. I will present the results from Monte Carlo simulations run in order to understand how to calibrate the COURE detector during operations and how to calibrate the CUORE detector in circumstances where the twelve calibration strings fail to deploy properly.

[1]Maruyama Group / CUORE collaboration

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