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Detector Simulations and Background Studies for the MOLLER Experiment SAKIB RAHMAN, University of Manitoba — The MOLLER experiment proposes to measure the parity-violating asymmetry A_{PV} in electron-electron (Møller) scattering. $A_{PV} = \frac{\sigma_+ - \sigma_-}{\sigma_+ + \sigma_-}$ where σ_+ and σ_- are the cross-sections for scattered electrons with positive and negative helicity respectively. In the experiment, an 11 GeV beam of longitudinally polarized electrons is incident on a liquid hydrogen target. The yields in each helicity state are measured by an array of 224 integrating quartz detectors 28 meters downstream from the target position. A spectrometer consisting of two resistive toroidal magnets and a system of collimators provides kinematic separation and shielding from backgrounds. The yields need to be corrected for helicity-correlated beam properties and background asymmetries to achieve high precision. The goal of this work is to optimize the signal-to-background contributions at the detector plane, including both the dilution and asymmetry from different backgrounds by minimizing and understanding their sources and the relative responses of the detectors. In this presentation, I will discuss the status of background studies performed with the Geant 4 simulation toolkit and the development of a parametrized detector geometry in the simulation.

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