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Simulation and Performance of Radiation Shielding for Recent and Future Parity-Violating Electron Scattering Experiments at Jefferson Lab [1] SAKIB RAHMAN, The University of Manitoba, PREX-2 COLLABORATION, MOLLER COLLABORATION — The parity-violating asymmetry resulting from the weak interaction, when a longitudinally polarized electron beam is scattered from an unpolarized target, can be used to probe nuclear structure or to test the limits of the Standard Model. The PREX-2 and CREX experiments used 1 GeV and 2.2 GeV electron beams respectively, elastically scattering from the Pb-208 and Ca-48 nuclei to measure the neutron skins that constrain the nuclear symmetry energy and models of nuclear structure. MOLLER is a future experiment that will scatter an 11 GeV electron beam from atomic electrons in a liquid Hydrogen target to measure the electroweak mixing angle and compare against Standard Model predictions as an indirect search for new physics. Such a search is currently beyond the energy scale reachable by direct searches. An important aspect of the experimental design is radiation shielding optimization to suppress physics backgrounds and mitigate damage to the experimental instruments and hall infrastructure. This talk summarizes the optimization studies currently underway for MOLLER, particularly discussing the effects on collimators, magnets, detectors, and experimental hall; considering the lessons learned from simulation and performance of radiation shielding for the PREX-2/CREX experiments.

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