Contribution ID: **17** Type: **Contributed Oral**

Signal corrections using background detectors in MOLLER experiment

Thursday, 16 February 2023 20:30 (15 minutes)

Distinguishing between signal events and background events is the main issue in the integrating measurments of nuclear physics and particle physics experiments. Signal corrections can be accomplished either theoretically or experimentally. In the experimental approaches, a set of detectors called background detectors is implemented. In background detectors, the majority of particles generating the main signal are blocked and particles causing the background are detected.
The Measurement of a Lepton Lepton Electroweak Reaction (MOLLER) is an experiment that requires signal corrections to achieve precise measurements of parity-violating asymmetry (A_PV). MOLLER will measure A_PV in the scattering of longitudinally-polarized electrons from unpolarized target electrons to an accuracy of 2.4% using an 11 GeV beam in Hall A at Thomas Jefferson National Accelerator Facility (JLab). Required experimental corrections arise from background processes that are characterized by fractional dilution factors and background asymmetries. Pion dilution factors and asymmetries are a significant contribution to the experimental correction and will be measured in dedicated pion detectors optimized to maximize the signal from pions.
This talk will review the MOLLER experiment and detail the optimization processes for the pion detector system. It is followed by the verification of the results from the simulation through the cosmic test and a beam test at MAMI-B microtron at Mainz, Germany. We acknowledge the support of the Natural Sciences and Engineering Research Council of Canada (NSERC).

Supervisor

Wouter Deconinck

Funding Agency

Natural Sciences and Engineering Research Council of Canada (NSERC) MOLLER grant

Supervisor Email

wouter.deconinck@umanitoba.ca

Your Email

gorgannf@myumanitoba.ca

Primary author: Ms GORGANNEJAD, Fatemeh (University of Manitoba)

Presenter: Ms GORGANNEJAD, Fatemeh (University of Manitoba)

Session Classification: February 16 Evening Session

Track Classification: Physics Beyond the Standard Model