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Geometric Optimization of a Symmetric System of Neutron Flux Detectors for BL3[1] AUSTIN NELSEN, EMILY BALLANTYNE, REBECCA CALVERT, SARAH VICKERS, CHRIS CRAWFORD, University of Kentucky, BL3 COLLABORATION — The recent measurement of the lifetime of the free neutron using the beam method has an 8.7 s (4σ) discrepancy with UCN measurements. The goal of the BL3 experiment is to improve the statistical error of this measurement and explore systematic uncertainties as an explanation for the discrepancy. A well-characterized neutron flux detector with flat response is important since the neutron flux enters linearly into the neutron lifetime. I will present a group theoretic formalism for the geometric optimization of n neutron detectors for uniform acceptance as a function of the neutron position and describe how to use this symmetry to extract other parameters from the detector rates such as the beam centroid, ellipticity, and RMS width.

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