

Abstract Submitted  
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**Optimization of BL3 Neutron FluxDetectors**<sup>1</sup> AUSTIN NELSEN, EMILY BALLANTYNE, REBECCA CALVERT, SARAH VICKERS, CHRIS CRAWFORD, Univ of Kentucky, BL3 COLLABORATION — The recent measurement of the lifetime of the free neutron using the beam method has an 8.7s ( $4\sigma$ ) discrepancy with UCN measurements. The goal of the BL3 experiment is to improve the statistical error of this measurement and help rule out systematic uncertainties as an explanation for the discrepancy. A well-characterized neutron flux detector with flat response is essential, since the neutron flux enters linearly into the neutron lifetime. I will present a new detector geometry optimization with uniform acceptance up to sixth order in neutron position. We have determined the optimal position, orientation, and shape of one and two rings of detectors through a series of analytical and numerical calculations.

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