Abstract Submitted
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Optimized shielding design for the time-resolved Magnetic Recoil Spectrometer (MRSt) on the NIF* [1] C. WINK, J. FRENJE, M. GATU JOHNSON, C.K. LI, F. SEGUIN, R. PETRASSO, MIT, T. HILSABECK, GA, R. BIONTA, H. KHATER, LLNL — To meet the goals for the MRSt to measure the neutron spectrum at the NIF with a time resolution of ˜20 ps and an accuracy of ˜5%, a S/B >5 for the down-scattered neutron measurement is required. As the MRSt-detector design consists of a pulse-dilation drift tube with a CsI photocathode positioned at the focal plane of the spectrometer and a microchannel plate (MCP) for signal gain, the S/B requirement can be met if the number of secondary electrons (SE) produced by neutron and γ-ray background in these components is reduced 50-100 times. It has been shown in ref. [1] that the SE generated by the neutron and γ-ray background in the CsI is insignificant and won't affect the MRSt measurement. However, the MCP poses a greater S/B challenge due to higher background sensitivities. In this paper, we discuss an MRSt SE generation model, which includes the CsI photocathode and MCP, and the MRSt shielding design required to reduce the MCP background to the required level for a down-scattered neutron measurement. [1] C. Wink et al., RSI (2016).

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