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## $^3\text{He}$ polarization and injection system for the nEDM@SNS SOS apparatus

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The Systematic and Operations Studies (SOS) for the neutron electric dipole moment (nEDM) experiment at the Spallation Neutron Source (SNS) will measure the trajectory correlation functions of  $^3\text{He}$  and neutrons in order to determine the expected frequency shift from the geometric phase effect in the nEDM@SNS experiment. To this end the SOS apparatus will utilize Metastability Exchange Optical Pumping (MEOP) to polarize  $^3\text{He}$  to 80% polarization at room temperature. The  $^3\text{He}$  is then injected into measurement cell inside the cryovessel where the experiment is performed with concentrations of  $^3\text{He}$  as low as  $10^{-10}$  and a temperature of 0.4 K. We describe the polarization and injection system as well as report on results from tests of the MEOP system, simulations of  $^3\text{He}$  injection, and our calculations of trajectory correlation functions.

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