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A Solid Oxygen Ultra-Cold Neutron Source CHRISTOPHER LAVELLE, CHEN-YU LIU[1], YUN SHIN, Indiana University — Ultra-Cold Neutrons (UCN) are produced in super-thermal sources via a single inelastic down scattering event of a low energy neutron in a medium. Solid deuterium and liquid helium are the primary sources of UCN for fundamental physics research due to very low absorption cross-sections and good transparency to UCN. Solid Oxygen is an attractive alternative because it has a lower absorption cross-section and theoretically higher potential to down scatter cold neutrons to the UCN energy regime via magnon excitation. A solid oxygen source could then produce higher densities of UCN in a larger volume, enhancing the UCN flux available to experiments by as much as an order of magnitude. We present an apparatus for testing UCN production in a cold neutron beam such as at Los Alamos Neutron Scattering Center as well as a proposed UCN source based on solid oxygen for Indiana University.

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