

Abstract Submitted
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An Ortho/Para Deuterium Converter for Ultra-Cold Neutron Production at Los Alamos National Laboratory ADAM CLARK, Valparaiso University — The production of Ultra-Cold Neutrons (UCN) is essential for a number of experiments whose goal is to make precise measurements of neutron properties. With order-of-magnitude improvements in precision provided through the use of UCN, scientists plan to push towards physics beyond the Standard Model. At Los Alamos National Laboratory (LANL) a solid deuterium target is used for UCN production. As a result of previous studies, it is known that the storage time of UCN is dependent on the spin state of the deuterium target. The spin = 1 state of deuterium (para-D₂), in which approximately one-third of the D₂ molecules can be found, results in a shorter UCN residence time. Therefore, to lengthen the storage time, a conversion to the ground state (ortho-D₂) is required. Because, in a solid sample of D₂ it would take months for the sample to spontaneously relax to the required percentage of 99.8% ortho-D₂, an Ortho/Para converter is used to accelerate the conversion. This project focuses on the design of a new, improved Ortho/Para Converter. The production of UCN at LANL and the work done to design the new Ortho/Para Converter for the LANL UCN system will be discussed.

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