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UCN Production from Solid Oxygen Confined in Amorphous Carbon CHRIS CUDE-WOODS, CHEN-YU LIU, DANIEL SALVAT, GREGORY MANUS, Indiana University, AARON COUTURE, LANL — The utility of Ultra-Cold Neutrons (UCN) in fundamental physics has been constrained by the difficulty of producing them in sufficiently high density. This has led to an interest in the development of improved UCN sources. Solid oxygen has shown promise over previous super-thermal sources as a UCN converter and has several advantages, including small nuclear absorption, unique magnetic properties, and lack of incoherent scattering. Our group's previous work has demonstrated a prototype bulk solid oxygen converter and an apparatus to study its performance as a function of temperature. Using a slightly modified apparatus–benchmarked with bulk solid oxygen– our present study tests a new source that confines oxygen within a carbon "nano-pore" matrix. By freezing oxygen in confinement, we seek to suppress the α to β phase transition, thus extending the higher production cross-section of β-oxygen to lower temperatures, thereby increasing UCN yield. We have carried out a UCN production experiment at FP12 at Lujan Neutron Center at Los Alamos National Laboratory in the summer of 2010. The results of the analysis and simulation will be presented in this poster.

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