

Abstract Submitted  
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**Production and Quality Control Improvements in the Fabrication of Diamond-Like-Carbon Guides** DAVID RICHARDSON, RUSSELL MAMMEI, BRUCE VOGELAAR, MARK PITT, UCNA COLLABORATION — Stemming from the search for physics beyond the Standard Model, the goal of the UCNA collaboration is to obtain the value of  $V_{ud}$ . The weak and axial vector coupling constants provide an effective means of determining  $V_{ud}$  but require knowledge of the angular correlation between the spin vector of the neutron and the momentum vector of the electron during beta-minus decay. Due to their superiority in minimizing systematic errors, Ultra-Cold Neutrons (UCN) were adopted for UCNA experiments. UCN require transport guides exhibiting the properties of being minimally depolarizing, nonmagnetic, nonconductive, possessing a high Fermi potential and high specularly. Experiments have shown that quartz tubes coated with Diamond-Like Carbon (DLC) are exceptional in the aforementioned categories. Recent improvements in the production process at Virginia Tech, including a refined cleaning procedure, the installation of a target rastering system, improved monitoring diagnostics, and a new drive mechanism have been implemented yielding improved guide quality. Furthermore, the use of X-ray spectroscopy has been employed to determine the quality of the DLC guides. Results of these improvements along with analytical results from X-ray spectroscopy will be presented.

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