

Abstract Submitted
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Noble Gas Leak Detector for Use in the SNS Neutron Electric Dipole Moment Experiment¹ CHAD BARROW, PAUL HUFFMAN, KENT LEUNG, EKATERINA KOROBKINA, CHRISTIAN WHITE, TUNL - NCSU, NEDM COLLABORATION COLLABORATION — Common practice for leak-checking high vacuum systems uses helium as the probing gas. However, helium may permeate some materials at room temperature, making leak characterization difficult. The experiment to find a permanent electric dipole moment of the neutron (nEDM), to be conducted at Oak Ridge National Laboratories, will employ a large volume of liquid helium housed by such a helium-permeable composite material. It is desirable to construct a leak detector that can employ alternative test gases. The purpose of this experiment is to create a leak detector that can quantify the argon gas flux in a high vacuum environment and interpret this flux as a leak-rate. This apparatus will be used to check the nEDM volumes for leaks at room temperature before cooling down to cryogenic temperatures. Our leak detector uses a residual gas analyzer and a vacuum pumping station to characterize the gas present in an evacuated volume. The introduction of argon gas into the system is interpreted as a leak-rate into the volume. The device has been calibrated with NIST certified calibrated leaks and the machine's sensitivity has been calculated using background gas analysis. As a result of the device construction and software programming, we are able to leak-check composite and polyamide volumes

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Chad Barrow
TUNL - NCSU

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