

Abstract Submitted  
for the DNP19 Meeting of  
The American Physical Society

**Study of Vibrations in the Nab Magnetic Spectrometer** HUNTER PRESLEY, Undergraduate - University of Tennessee, Knoxville, ORNL NAB COLLABORATION COLLABORATION — The Nab experiment intends to precisely measure the beta decay correlation parameters “a” and “b” for the free neutron. The experiment is in the process of being commissioned on the Fundamental Neutron Physics Beamline at the Spallation Neutron Source of the Oak Ridge National Laboratory. The focal point of the experiment is the seven meter, superconducting, magnetic spectrometer which is used to measure electron energy and proton time-of-flight. The magnet is cooled to 4 kelvin by four mechanical cryocoolers positioned on the upper and lower half of the magnet. Each cold head contains a moving valve operating at about one hertz. The motion of these valves is coupled to the magnet and small amplitude vibrations can be felt by hand. If large enough, the vibrations will cause the detectors to move in the magnetic field, which gives rise to an additional source of noise. The detectors are located at the upper and lower end of the spectrometer. To evaluate the potential impact of the vibrations, an accelerometer was used to measure vibration spectrum for each cryocooler cold head and as well for both ends of the spectrometer. I’ll describe the measurements where I used an Endeveco model 2228B accelerometer read by a Hewlett Packard Spectrum Analyzer. I’ll give results including reference measurement of floor vibration.

Hunter Presley  
Undergraduate - University of Tennessee, Knoxville

Date submitted: 24 Jul 2019

Electronic form version 1.4