Contribution ID : **75** Type : **Physics Beyond the Standard Model**

Measurements of the TUCAN Vertical UCN Source Heat Load Response

Tuesday, 9 February 2021 17:15 (15)

The TUCAN collaboration is developing a dense source of Ultracold neutrons (UCN) that will be used in a neutron Electric Dipole Moment (nEDM) experiment, with a goal sensitivity of $10^{(-27)}$ e*cm which is 10 times more precise than the best measurement to date. UCNs are neutrons with energies below 300 neV, that are travelling with speeds less than 30 km/h. In order to carry out a world-leading nEDM experiment higher densities of UCN need to be produced. The TUCAN UCN are produced by cooling spallation neutrons to cold temperatures in successive layers of increasingly cold moderator, where the UCN production layer is a liquid He-II vessel, where cold neutrons (~1 meV) down scatter to UCN energies (~100 neV) by interactions with phonons and rotons in the fluid. The UCN production becomes more efficient when the He-II is kept at temperatures below 1~K, which is difficult because of the heat flux from the spallation target. Critical to the performance of the superfluid helium UCN source is the temperature of the superfluid and its response to heat input. The TUCAN collaboration aims to achieve their goal by developing a next generation UCN source based on superfluid helium. To benchmark the design of the new He-II source, heater tests were performed, and a model of the heating of the source was developed. In this talk, I will present the simple heating model that was developed, and how well the heater test measurements matched this model.

email address

seanhansenromu@gmail.com

Please select: Experiment or Theory

Experiment

Primary author(s) : HANSEN-ROMU, Sean (University of Manitoba)

Presenter(s) : HANSEN-ROMU, Sean (University of Manitoba)