Contribution ID: **290** Type: **Poster**

The mercury co-magnetometer in the n2EDM experiment

Tuesday, 18 October 2022 16:19 (1 minute)

The n2EDM experiment at PSI's Ultracold Neutron source aims at searching for the permanent neutron electric dipole moment with a sensitivity of about 1×10^{-27} ecm with the baseline setup. In order to correct for first order magnetic field drifts and gradients when using Ramsey's method of separated oscillating field with ultracold neutrons, this experiment requires a precise knowledge of the magnetic field. Therefore, a laser-based mercury co-magnetometer has been developed to measure the magnetic field in the two precession chambers where the UCN precess together with the Hg atoms. By taking the ratio of the mercury to neutron spin precession frequencies we will correct for systematic uncertainties related to the magnetic field.
To spin-polarize the mercury atoms, a UV laser beam will be directed to the mercury polarization chamber. The volume-averaged magnetic field can be measured by analyzing the mercury precession signal probed by another UV beam traversing the precession chambers. The stabilization of the laser light is essential for this measurement, including frequency, position, and power stabilization. The poster will present the research on frequency locking techniques of the laser source, the more than 10 meter long transport line from a laser lab to the main experimental setup, and a discussion of mercury-related systematic uncertainties.

Support by SNF Project #204118 is gratefully acknowledged.

Primary author: CHEN, Wenting (PSI - Paul Scherrer Institut)

Presenter: CHEN, Wenting (PSI - Paul Scherrer Institut)

Session Classification: BBQ - Drinks & Posters