

Challenges of the world-wide experimental search for the electric dipole moment of the neutron



Contribution ID: 41

Type: Poster

A laser based mercury magnetometer for the nEDM experiment at PSI

Tuesday, 4 November 2014 17:43 (1 minute)

The nEDM experiment requires very sensitive magnetometers to correct for systematic errors related to magnetic field fluctuations. We present progress on a laser based co-magnetometer which detects the spin precession frequency of ^{199}Hg atoms in the same volume as the neutrons. With the new laser system, we showed in a proof of principle measurement that we can achieve a fivefold increase of the signal compared to the light from a ^{204}Hg discharge lamp we have been using. In order to compare laser based and lamp based magnetometer sensitivity, we developed a statistical analysis method based on the Cramer-Rao Lower Bound. This work is supported by the SNF under grant 200020_144473.

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Session Classification: Poster