

Abstract Submitted
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Measurement of the charge of the neutron in experiments searching for a permanent neutron EDM¹ PRAJWAL MOHANMURTHY, Massachusetts Institute of Technology MIT — The charge of the neutron is an extremely well measured number, and is consistent with zero. Nonetheless, motivations for the existence of minicharges questions charge conservation and thereby the neutrality of neutrons. Room temperature neutron electric dipole moment (nEDM) experiments employ the Ramsey technique of separated oscillating fields to search for a permanent EDM of the neutron. Due to a large geometric phase effect coming from the magnetic field gradients that the UCNs experience, usually the EDM is extracted using a crossing point analysis which involves measuring the EDM at well known non-zero gradients, and then extracting the EDM at zero gradient. One of the free parameters in the crossing point analysis is the center of mass offset between the ensemble of UCNs and the cohabiting ¹⁹⁹Hg atoms, which is used as a co-magnetometer. Given that the UCNs are stored under the influence of a strong electric field, even though the precession frequency of the neutrons extracted using the Ramsey technique has no dependence on the charge of the neutron, the center of mass offset in the crossing point analysis may be dependent on the charge of the neutron. The sensitivity reach of this technique at the leading nEDM experiments will be presented.

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