

A new measurement of the permanent electric dipole moment of ^{129}Xe using ^3He comagnetometry and SQUID detection

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We describe a new technique to measure the EDM of ^{129}Xe with ^3He comagnetometry. Both species are polarized using spin-exchange optical pumping, transferred to a measurement cell, and transported into a magnetically shielded room, where SQUID magnetometers detect free precession in applied electric and magnetic fields. The result of a one week run combined with detailed study of systematic effects is $d_A(^{129}\text{Xe}) = (0.26 \pm 2.33_{\text{stat}} \pm 0.72_{\text{syst}}) \times 10^{-27} e \text{ cm}$. This corresponds to an upper limit of $|d_A(^{129}\text{Xe})| < 4.81 \times 10^{-27} e \text{ cm}$ (95% CL), a factor of 1.4 more sensitive than the previous limit.