

Improved limit on the radium-225 electric dipole moment

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Searches for permanent electric dipole moments (EDMs) are sensitive to time-reversal, parity, and charge-parity (CP) violation, and, as such, are excellent probes for physics beyond the Standard Model. ²²⁵Ra ($t_{1/2}=15\text{d}$, $I=1/2$) is a particularly attractive system to use for an EDM search because its large nuclear octupole deformation makes it uniquely sensitive to CP-violating interactions in the nuclear medium. We have developed an experiment to measure the EDM of ²²⁵Ra based on laser cooling and trapping techniques, demonstrated a first proof-of-principle measurement [1], and, most recently, have significantly improved the sensitivity of our instrument to set an upper limit for the ²²⁵Ra EDM of 1.4×10^{-23} e cm (95% C.L.)[2]. Upcoming experimental upgrades have the potential to improve our EDM limit by additional orders of magnitude.

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[1] R.H. Parker *et al.*, PRL **114**, 233002 (2015)

[2] M. Mishof *et al.*, PRC **94**, 025501 (2016)