

14th Wine & Cheese Seminar 2014.6.27(Fri) 17:30 at Room 525

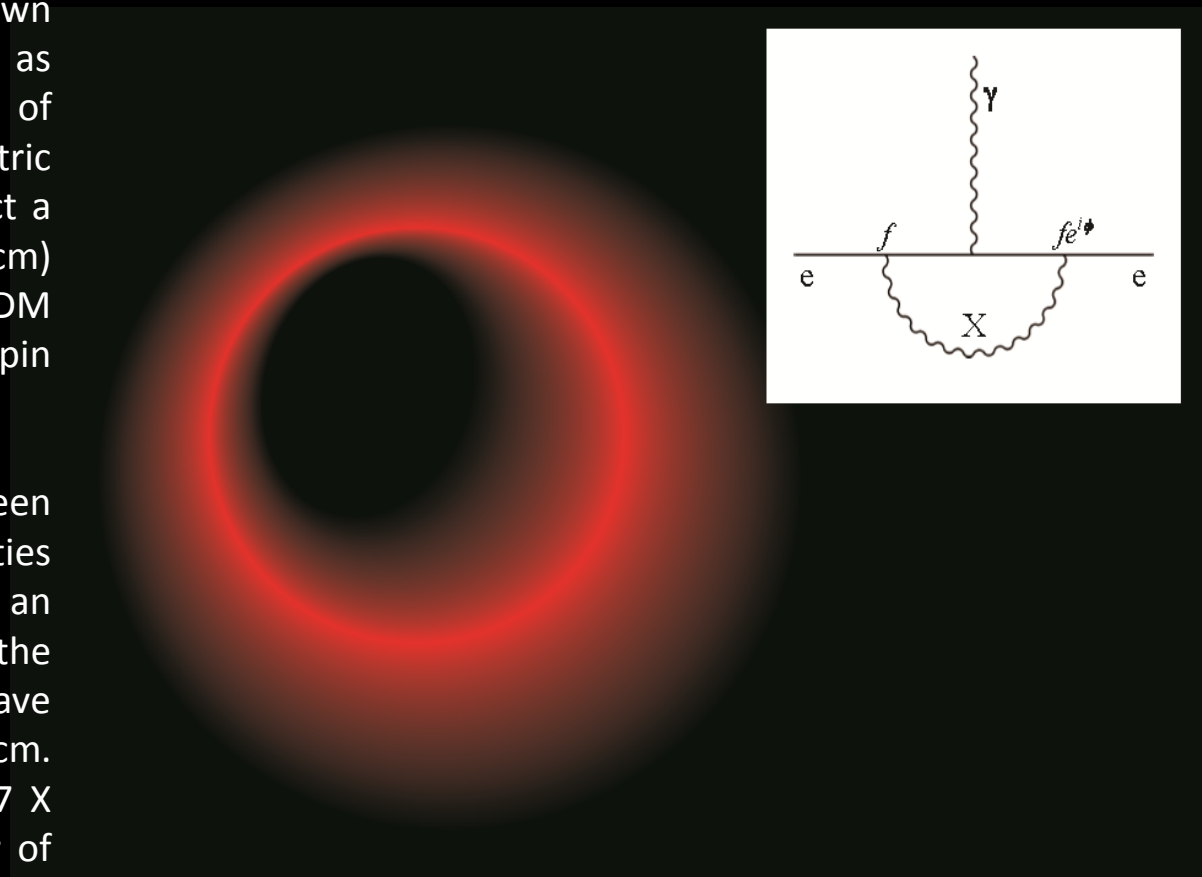
**Order of Magnitude Smaller Limit
on the Electric Dipole Moment of the Electron**

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The Standard Model (SM) of particle physics is known to be incomplete. Extensions to the SM, such as weak-scale Supersymmetry, posit the existence of new particles and interactions that are asymmetric under time-reversal (T), and nearly always predict a small, yet potentially measurable (10^{-27} - 10^{-30} e·cm) electron electric dipole moment (EDM, d_e). The EDM is an asymmetric charge distribution along the spin that is also asymmetric under T.

About five years ago, ACME, a collaboration between groups at Yale and Harvard universities (<http://www.electroedm.org>), embarked upon an improved search for the electron EDM. Using the polar molecule thorium monoxide (ThO), we have now measured $d_e = (-2.1 \pm 3.7_{\text{stat}} \pm 2.5_{\text{syst}}) \times 10^{-29}$ e·cm. This corresponds to an upper limit of $|d_e| < 8.7 \times 10^{-29}$ e·cm with 90 percent confidence, an order of magnitude improvement in sensitivity compared to the previous best limits. Our result constrains T-violating physics at the TeV energy scale.



**Virtual SUSY Particles
Could Deform the Electron**