

Measuring the electron electric dipole moment with laser-cooled YbF

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Measurements of the electron's electric dipole moment (eEDM) using molecules tightly constrain the parameters of theories that extend the Standard Model. Certainly polar molecules act as amplifiers for the eEDM, with the current best limit on its size coming from a recent experiment using ThO [1]. I will present our plans to make a new measurement of the eEDM using YbF. I will discuss the design and construction progress of a molecular beam apparatus which will incorporate transverse cooling of a slow YbF beam [2]. I will also discuss our implementation of cycling transitions in state preparation and detection of the molecules. These improvements promise several orders of magnitude improvement in the sensitivity of the eEDM measurement using YbF [3].

[1] *Improved limit on the electric dipole moment of the electron*, ACME Collaboration. *Nature* **562**, 355-360 (2018).

[2] *Laser Cooled YbF Molecules for Measuring the Electron's Electric Dipole Moment*, J. Lim et al., *Phys. Rev. Lett.* **120** 123201 (2018).

[3] *Improved measurement of the shape of the electron*, J. J. Hudson et al., *Nature*, **473** 493 (2011).