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Improved Measurement of the electron electric dipole moment using YbF B.E. SAUER, P.C. CONDYLIS, J.J. HUDSON, M.R. TARBUTT, E.A. HINDS, Imperial College London — A permanent electric dipole moment of an electron, d_e, violates time reversal symmetry. The current limit[1] on the size of d_e is many orders of magnitude larger than the Standard Model prediction, but is in the range predicted by many extensions to the Standard Model. This makes improved experiments particularly exciting as a background-free search for physics beyond the Standard Model. We have previously published a limit on d_e measured using a thermal beam of YbF molecules.[2] YbF is particularly sensitive to d_e and is immune to some of the most troublesome systematic effects encountered in atomic experiments. We have improved our experimental apparatus by developing a pulsed supersonic source of YbF[3] which produces molecules with a rotational temperature of a few K. Using this new source, we are currently taking data with a statistical sensitivity of 1×10^{-27}e.cm in 24 hours of data collection. We will present our new results and discuss possible systematic effects in the experiment.

[1] B. C. Regan, et al., Phys. Rev. Lett. **88**, 071805 (2002).
[2] J. J. Hudson, et al., Phys. Rev. Lett. **89**, 023003 (2002).
[3] M. R. Tarbutt, et al., J. Phys. B At. Mol. Opt. Phys. **35**, 5013 (2002).

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