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A cryogenically-cooled source of YbF molecules for measuring the electron's electric dipole moment

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Certain polar molecules can be used to measure the electron's electric dipole moment (edm) to high precision. In our electron edm measurement at Imperial College London, we currently use a beam of YbF molecules derived from a supersonic source. We are developing a new source of cold YbF molecules based on cryogenic buffer gas cooling. The molecules are created by laser ablation inside a cryogenically-cooled cell of helium gas. They are cooled to the helium temperature and then leave the cell through a hole to form an intense, slow-moving, cold beam. We present our measurements of the intensity, speed and temperature of this new YbF beam, and discuss how we will use it to the benefit of a new edm measurement.

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