

Abstract Submitted
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State-sensitive detection of HfF⁺ for eEDM search KANG-KUEN NI¹, HUANQIAN LOH, MATT GRAU, KEVIN COSSEL, DANIEL GRESH, JUN YE, ERIC CORNELL, JILA, NIST and University of Colorado (Boulder) — HfF⁺ can be a sensitive probe for measurement of the electron electric dipole moment due to the large effective internal electric field. However, efficient detection of the state of molecules has been one bottleneck. We have now developed a new detection scheme based on efficient ion counting. The state information of the HfF⁺ is read out via a two-photon dissociation pulse. The first photon drives a state-sensitive transition and the second photon dissociates the molecule into Hf⁺ and F. Through mass-resolved time-of-flight ion detection, we count Hf⁺ ions produced from HfF⁺ in the specified detected state. The efficiency is 100-fold increased compared to our previous readout method, laser-induced fluorescence.

¹ni@jilau1.colorado.edu

Matt Grau
JILA, NIST and University of Colorado (Boulder)

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