

Abstract Submitted
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Two-Photon Vibrational Transitions in O_2^+ as Probes of Variation of the Proton-to-Electron Mass Ratio¹ DAVID HANNEKE, RYAN CAROLLO, ALEXANDER FRENETT, Amherst College — Molecular vibrations provide sensitive probes for variation of the proton-to-electron mass ratio μ . The O_2^+ molecule has many vibrational overtone transitions that appear capable of detecting change at the 10^{-18} level or better [1]. Here we report calculations of two-photon transition rates, systematic effects, and achievable statistical precision for measurements using these overtones. We present results of state preparation via photoionization and progress towards driving the transitions and detection via photodissociation. [1] R. Carollo, A. Frenett, D. Hanneke, *Atoms* v.7, 1 (2019)

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