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Search for Time Variation of Fundamental Constants in Nonpolar Molecular Ions[1] RYAN CAROLLO, ALEXANDER FRENETT, CHRISTIAN PLUCHAR, DAVID HANNEKE, Amherst College — Trapped and sympathetically cooled O_2^+ ions provide several paths to performing precision measurements of the time variation of the proton-to-electron mass ratio. We describe one such scheme, two-photon vibrational overtone transitions. The nonpolar nature of O_2^+ as well as its $^2\Pi_g$ ground state suppress many systematic effects. We discuss plans and progress towards a short-term goal on $\dot{\mu}/\mu$ that would match current limits set in molecular systems. The O_2^+ vibrational overtones have long-term prospects below the most stringent limit to date in any system.

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