

Title: Measurement of the Variation of Electron-to-Proton Mass Ratio Using Ultracold Molecules Produced from Laser-Cooled Atoms

Abstract: A rovibrationally pure sample of ultracold KRb molecules was used to improve the measurement on the stability of electron-to-proton mass ratio ($\mu = m_e/M_p$). The measurement was based upon a large sensitivity coefficient of the molecular spectroscopy, which utilizes a transition between nearly degenerate pair of vibrational levels each associated with a different electronic potential. Observed limit on temporal variation of μ was $1/\mu \, d\mu/dt = (0.30 \pm 1.0) \times 10^{-14}/\text{year}$, which was better by a factor of five compared with the most stringent laboratory molecular limits to date.