

PRECISION MEASUREMENT WITH CAVITY-ENHANCED BUFFER-GAS COOLED MICROWAVE SPECTROSCOPY

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We report for the first time highly precise differential microwave spectroscopy, carried out in a cavity-enhanced buffer gas cell. We report a statistically limited differential measurement of 0.08 ± 0.72 Hz between (R)- and (S)-1,2-propanediol at frequencies around 15 GHz ^a. This highly repeatable measurement opens new avenues in studying molecular structure at the 10^{-10} level. We also report the coupling of a neon buffer gas beam to this cavity, reaching linewidths of 3 kHz in methyltrioxorhenium, and future modifications to reach 1.5 kHz linewidth.

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