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Constraint on a drifting proton-to-electron mass ratio at $z=0.89$ from methanol observations at three radio telescopes

A tight constraint on a variation of the proton-to-electron mass ratio μ , is derived from radio astronomical observations of methanol (CH₃OH) lines. The target is the lensing galaxy in the los of blazar PKS1830-211 at redshift $z=0.89$. The observations covers different frequencies and were carried out using three telescopes: the Effelsberg 100m telescope, the IRAM 30m telescope and the novel ALMA. Ten methanol transitions are detected, yielding a constraint of $d\mu/\mu = (-1.9 \pm 1.7) \times 10^{(-7)}$.