

White-dwarf spectra for studies of time variation of the fine structure constant

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ABSTRACT

We report a newly updated constraint on space-time variation in the fine structure constant, $\alpha = \frac{e^2}{4\pi\epsilon_0\hbar c}$, from an analysis of white dwarf spectra. We obtain $\Delta\alpha/\alpha = (0.007 \pm 0.087) \times 10^{-6}$ from a comparison of laboratory spectra of Fe V with found spectra from the white dwarf G191-B2B. The obtained result suggests how the inferred measurements of cosmology can advance these limitations in the future and can estimate the space-time variation in α with strong gravitational fields.