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Shifts due to quantum-mechanical interference from distant neighboring resonances for saturated fluorescence spectroscopy[1] ALAIN MARSMAN, MARKO HORBATSCH, ERIC A. HESSELS, York University — Quantum-mechanical interference with distant neighboring resonances is found to cause shifts for precision saturated fluorescence spectroscopy of the atomic helium $2\,^3S$-to-$2\,^3P$ transitions. The shifts are significant (larger than the experimental uncertainties for measurements of the intervals) despite the fact that the neighboring resonances are separated from the measured resonances by 1400 and 20 000 natural widths. The shifts depend strongly on experimental parameters such as the angular position of the fluorescence detector and the intensity and size of laser beams. These shifts must be considered for the ongoing program of determining the fine-structure constant from the helium $2\,^3P$ fine structure. The work represents the first study of such interference shifts for saturated fluorescence spectroscopy and follows up on our previous study [1] of similar shifts for laser spectroscopy.

[1] A. Marsman, M. Horbatsch, E.A. Hessels, Physical Review A **86**, 040501(R) (2012)

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