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Sideband oscillations in four-photon RABBIFT scans.[1] DAVID ATRI SCHULLER, KATHRYN HAMILTON, KLAUS BARTSCHAT, Drake University, NICOLAS DOUGUET, Kennesaw State University, DIVYA BHARTI, ANNE HARTH, Max-Planck-Institute for Nuclear Physics — Extracting sideband phase information from standard RABBITT (reconstruction of attosecond beating by interference of **two**-photon transitions) scans is a common technique to measure attosecond time delays in photoionization [1]. Here we further investigate the **four**-photon setup (RABBIFT), suggested in [2], where the intensity of the sidebands generated by a probe frequency ω_p oscillates according to $I(\tau) \propto \cos(-4\,\omega_p\tau + \Delta\phi_\epsilon)$, where τ is the delay between the XUV and IR pulses and $\Delta\phi_\epsilon$ is an energy-dependent phase. Here we examine the intensity and pulse-length dependence of $\Delta\phi_\epsilon$ for realistic experimental setups ($I_{\rm XUV} = 10^9\,{\rm W/cm^2}$, $I_{\rm IR} = 10^{11} - 10^{12}\,{\rm W/cm^2}$, pulse lengths $20 - 100\,{\rm fs}$) by comparing RABBIFT scans from *ab initio* TDSE calculations [3] for atomic hydrogen produced by different probe pulse durations and intensities. Preliminary results suggest a non-negligible dependence of $\Delta\phi_\epsilon$ on the latter parameters. [1] P. Paul et al., Science **292** (2001) 1689. [2] A. Harth et al., Phys. Rev. A **99** (2019) 023410. [3] N. Douguet et al., Phys. Rev. A **93** (2016) 033402.

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