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Multi-level interference resonances in strongly-driven three-level systems JEROEN DANON, MARK RUDNER, Niels Bohr Inst — We study multi-photon resonances in a strongly-driven three-level quantum system, where one level is periodically swept through a pair of levels with constant energy separation E. Near the multi-photon resonance condition $n\hbar\omega = E$, where n is an integer, we find qualitatively different behavior for n even or odd. We explain this phenomenon in terms of families of interfering trajectories of the multi-level system. Remarkably, the behavior is insensitive to fluctuations of the energy of the driven level, and survives deep into the strong dephasing regime. The setup can be relevant for a variety of solid state and atomic or molecular systems. In particular, it provides a clear mechanism to explain recent puzzling experimental observations in strongly-driven double quantum dots.

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