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Landau-Zener-Stueckelberg interferometry with low- and high-frequency driving SERGEY SHEVCHENKO, fB.Verkin Instiute for Low Temperature Physics and Engineering Kharkov, Ukraine, SAHEL ASHHAB, FRANCO NORI, The Institute of Physical and Chemical Research (RIKEN), Wako-shi, Japan, and The University of Michigan, Ann Arbor, USA — The problem of a periodically driven two-level system cannot be solved exactly. The rotating-wave approximation (RWA) is the most common approximation used to analyze this problem. I will discuss an alternative approximation that applies in the case of very strong driving, where the RWA is generally invalid. The dynamics is approximated by a sequence of Landau-Zener transitions that can interfere constructively or destructively, depending on the Stueckelberg phase accumulated between transitions. It turns out that the resonance conditions are qualitatively different for the cases of low- and high-frequency driving. I will discuss the two respective limits. I will also show that our theoretical results describe recent experiments on Landau-Zener-Stuckelberg interferometry with superconducting qubits [S.N. Shevchenko, S. Ashhab, and F. Nori, arXiv:0911.1917].

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