I will talk about the dynamics of a two-level quantum system under the influence of a strong harmonic driving field. In particular, we consider the situation where an avoided crossing in the energy-level structure is traversed repeatedly as a result of the oscillating driving field. Multiple Landau-Zener processes occur and can interfere constructively or destructively, depending on the various system parameters. It turns out that the fast-crossing regime and the slow-passage regime result in two qualitatively different resonance conditions. I will discuss these resonance conditions. I will also present two applications in two different areas of physics where Landau-Zener-Stueckelberg interferometry leads to interesting results: the "breakdown" of the adiabatic theorem and the reversal of stimulated emission.