Wannier-Stark Ladder

Effect of electric field on superlattice (Mendez et al Physical Review Letters 60, 2426, 1988) – very different from quantum well behaviour

Electric field $F = 0$
Finite electric field

Energy separation between transitions is

\[ \Delta E = \pm neFd \]

where \( d \) is period, \( n \) is integer, and \( F \) is field.
Experimental spectrum showing Wannier-Stark ladder

Spectra

Transition energies