A THz niche for AlP/GaP quantum wells

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We report on subband energy spectrum of electrons in AlP quantum wells as the outcome of recent effective mass measurements and valley-degeneracy, including the effect of strain caused by lattice mismatch between AlP and GaP [1]. We show that depending on the well thickness, the ground state subband has \( X_z \) symmetry for well thickness shorter than 5nm and \( X_{xy} \) symmetry for larger thickness. The knowledge of subband parameters in AlP/GaP quantum wells allows the design of both QCLs and QW detectors, taking into account the unique multi-valley subband structure of AlP quantum wells. [1] M.P. Semtsiv et al. Phys. Rev. B 74, 041303(R) (2006)

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