Abstract Submitted
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A THz niche for AlP/GaP quantum wells[1] M. GOIRAN, J. GALIBERT, J. LÉOTIN, LNCMP, Toulouse, V.V. RYLKOV, KRC, Moscow, M. SEMTSIV, O. BIERWAGEN, W.T. MASSELINK, Humboldt University, Berlin — The development of THz spectroscopy and imaging based on intersubband transitions in Quantum Cascade Lasers (QCL) is precluded to date in the wavelength range 20-60 μm (15-5 THz) because of the reststrahl band of currently used GaAs alloy materials. One option to overcome this limitation is to use AlP/GaP Quantum wells grown on a GaP substrate, but until recently the intersubband structure of AlP quantum wells was unknown, because the X-conduction band structure of AlP was not established. 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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