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Title: Przejścia magnetoptyczne w strukturach z wieloma studniami
kwantowymi

Abstract

The complex investigation of the magneto-transport and magneto-optical effects in structures containing multiple quantum well (MQW) based on the GaAs/AlGaAs-heterostructures has been performed. The parameters of 2DEG in MQW were determined from the data of the Integer Quantum Hall Effect (IQHE) and Shubnikov-de Haas oscillations (SdH) observed at low temperatures (1.4 – 4.2 K). Landau levels and shallow donor states in multiple GaAs/AlGaAs quantum wells (MQWs) are investigated by means of the cyclotron resonance at mega-gauss magnetic field. Measurements of magneto-optical transitions were performed in pulsed fields up to 150 T and temperatures from 6 to 300 K.

The 14×14 **Pp** band model for GaAs is used to interpret free-electron transitions in a magnetic field. Temperature behavior of the observed resonant structure indicates, in addition to the free-electron Landau states, contributions also of magneto-donor states in the GaAs wells and in the AlGaAs barriers. The magneto-donor energies are calculated using a variational procedure suitable for high magnetic fields and accounting for conduction band nonparabolicity in GaAs. It is shown that the above states, including their spin splitting, allow one to interpret the observed magneto-optical transitions in MQWs in the middle infrared region.