Multiexcitonic Emission from Quantum Dots Grown by "Indium-Flush" Method

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Quantum dots (QDs) are often referred to as "artificial atoms". Their electronic and optical properties are influenced by symmetry properties of the confining potential, atomic crystal structure and the geometric shape of the dots. In the case of "lens-shaped" QDs, while the energies and envelope wave functions of electronic states are well described by the *s*, *p*, and *d* energy shells of a two-dimensional harmonic oscillator, the hole energy levels cannot be grouped into such quasidegenerate shells. This is in contrast to the structure of QDs grown by the indium-flush method, in which both electronic and hole states can be described by the *s*, *p*, and *d* energy shells of a two-dimensional harmonic oscillator.

Properties of the QD grown by the indium-flush method will be reviewed in this presentation. The characteristic electronic structure of the "indium-flushed" dots is reflected in the pattern of the magnetic field evolution of the multiexcitonic emission, which resembles a single-particle Fock-Darwin diagram. Effects of interaction between the multiexcitonic configurations are clearly visible when single-particle states become nearly degenerate: at $B = 0$ and at a level crossing induced by the magnetic field.