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Auger recombination of excitons in semimagnetic quantum dot structure in a magnetic field ALEXANDER CHERNENKO, PAVEL DOROZHKIN, VLADIMIR KULAKOVSKII, ANREY BRICHKIN, Institute of Solid State Physics of RAS, SERGEY IVANOV, ALEXEY TOROPOV, Ioffe Physico-Technical Institute, INSTITUTE OF SOLID STATE PHYSICS OF RAS COLLABORATION[1], IOFFE PHYSICO-TECHNICAL INSTITUTE COLLABORATION — We present the results of magnetoluminescence study of ZnSe:CdMnSe quantum dots samples in a magnetic field up to 11 T both in the Faraday and Voigt geometries at liquid He temperatures and various levels of laser excitation. We found that the intensity of the quantum dot photoluminescence strongly increases (up to two orders of magnitude) in the Faraday geometry and only slightly ($\sim$ 1.5 times) in the Voigt geometry within the range of B=0-11 T . We explain the strong increase of the photoluminescence in the Faraday geometry within the frame of the spin-dependent Auger recombination of excitons through Mn ions. We relate the observed anisotropy of the quantum dot emission with the high anisotropy of the hole spins in QDs. We present a theoretical model which allows us to obtain selection rules for the Auger transition and thoroughly explains experimental results. The selections rules allow to explain characteristic fitures in single quantum dot spectra.

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