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Magneto-optical studies of magnetic polarons in type-II (Zn,Mn)Te/ZnSe quantum dots[1] BIPLOB BARMAN, ANDREAS RUSS, LARS SCHWEIDENBACK, JOSEPH MURPHY, RAFAL OSZWALDOWSKI, IAN SELLERS, ATHOS PETROU, IGOR ZUTIC, BRUCE MCCOMBE, ALEXANDER CARTWRIGHT, SUNY Buffalo, ANDRE PETUKHOV, South Dakota School of Mines & Technology, WU-CHING CHOU, WEN CHUNG FAN, National Chiao Tung University — We have recorded time-resolved emission spectra from a series of MBE grown (Zn,Mn)Te/ZnSe quantum dots (QDs) at 7 K in the 0 - 4 tesla magnetic field range. The photoluminescence (PL) spectra were analyzed into their $\sigma+$ and $\sigma-$ circularly-polarized components. The holes in this type-II system are confined in the (Zn,Mn)Te QDs, while the electrons reside in the surrounding ZnSe matrix. The PL intensity, peak energy, and circular polarization were recorded as a function of time and magnetic field. These studies show evidence of exchange coupling between the holes and Mn spins in the (Zn,Mn)Te QDs, which leads to the formation of magnetic polarons. The time scale of polaron formation is shorter than the recombination time in this type-II system. We discuss our results within the framework of a model that describes the magnetic polaron formation in this system.

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