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Magneto-photoluminescence studies of optical Aharonov-Bohm effect in type-II ZnTe/ZnSe semiconductor heterstructure Y.H. CHANG, C.H. HSU, C.C. HUANG, Department of Physics, National Taiwan University, W.C. CHOU, Department of Electrohysics, National Chiao Tung University, Y.W. SUEN, Department of Physics, National Chung Hsing University — Although the absolute phase of a quantum state is not measurable, the relative phase of a coherent charged particle wave could be manipulated. Recently, the effect of the magnetic flux on the excitonic energy has received much attention. In this talk we'll present our magneto-photoluminescence studies on the optical properties of type-II ZnTe/ZnSe self-assemble QDs system. The ZnTe/ZnSe samples were grown by molecular beam epitaxy with ZnSe layer grown on the GaAs substrate first and then ZnTe was grown on top of ZnSe. The ZnTe layers used in this study has thickness of 2.0, and 2.5 monolayers, respectively. Magneto-photoluminescence experiment was performed at T=1.4 K with a 14 T superconducting magnet in conjunction with a 405-nm diode laser and a monochromator. Sharp and clean emission peaks in magneto-PL spectra was observed and oscillation on the peak energy of the photoluminescence spectra as a function of magnetic field were observed for both the 2.0 ML and 2.5 ML samples and are attributed to the optical Aharonov-Bohm effect. The AB period changes from 9T for 2.0ML sample to about 6T for 2.5ML sample, i.e., we observed different AB periods for samples with different quantum dot size of the same system. In addition, the effect of impurity and defect on the AB oscillation will also be discussed.

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