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Nondegenerate time-resolved Faraday rotation in quantum wells: the role of exciton-exciton interactions YUMIN SHEN, ALEXANDER GOEBEL, HAILIN WANG, University of Oregon — Time-resolved Faraday rotation (TRFR) has been widely used in studies of spin related phenomena in semiconductors. Understanding the physical origin of TRFR is thus of special importance to these studies. In this paper, we report experimental studies based on the use of nondegenerate TRFR, in which we measured the spectral response of TRFR by varying the detuning between the pump and probe. Nondegenerate TRFR studies in GaAs and InGaAs quantum wells revealed that simple atomic-like model for TRFR fails to describe the spectral TRFR response. Theoretical analysis further indicated that manybody exciton-exciton interactions fundamentally modify the TRFR response in these semiconductor systems.

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