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Slow light and anomalous pulse breakup near an exciton resonance in GaAs quantum wells TIMOTHY SWEENEY, YAN GUO, SUSANTA SARKAR, HAILIN WANG, Department of Physics, University of Oregon, Eugene, OR 97403 — We report experimental studies of optical pulse propagation near an exciton resonance in GaAs quantum wells. The spectral dependence of the group velocity reveals a sharp decrease in the group delay when the spectral position of the optical pulse is varied from below to above the exciton absorption line center. The decrease in the group delay occurs in a spectral range that is small compared with the exciton absorption linewidth. Pulse breakups are also observed when input optical pulses with relatively low intensities are slightly below the exciton absorption line center. Detailed nonlinear optical studies suggest that these surprising behaviors arise from coherent population oscillation and especially a sharp increase of the exciton decoherence rate from below to above the exciton absorption line center.

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