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Temperature Dependence of Biexciton Decay and Intermolecular Hopping in Zinc Phthalocyanine Films. CHRISTOPHER RYAN, Graduate Student — The femtosecond exciton dynamics of melt-pressed zinc phthalocyanine (ZnPC) films are studied in the temperature range of 90-400 K. In this range ZnPC goes through a transition from a crystalline solid to a liquid crystalline phase. For the entire temperature range, the excitons are shown to decay on the time scale of 10's of picoseconds, and these dynamics are nonlinear with respect to pump fluence. Such a behavior is well described by a biexciton recombination model under one dimensional diffusion constraints. The single exciton lifetime and the biexciton recombination crosssection are extracted at all temperatures. From the latter, the exciton hopping time is calculated. The exciton hopping time decreases with temperature in the crystalline phase, but increases in the liquid crystalline phase. The role of temperature and structural order in the exciton hopping time will be discussed.

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