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Theoretical and experimental study of kinetics of photoexcited carriers in wide band gap semiconductors SARA SHISHEHCHI, Boston University, SERGEY RUDIN, GREGORY GARRETT, MICHAEL WRABACK, U.S. Army Research Laboratory, ENRICO BELLOTTI, Boston University — We present a theoretical and experimental study of the subpicosecond kinetics of photo-excited carriers in the wide band gap semiconductors GaN and ZnO. In the theoretical model, interaction with a photo-excitation laser pulse is treated coherently and a generalized Monte Carlo simulation is used to account for scattering and dephasing. The scattering mechanisms included are carrier interactions with polar optical phonons and acoustic phonons, and carrier-carrier Coulomb interactions. For comparison, experimental time-resolved photoluminescence studies on GaN and ZnO samples are performed over a range of temperatures and excitation powers.

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