

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Mapping free-carrier diffusion in GaAs with radiative and heat-generating recombination¹ TIM GFROERER, RYAN CRUM, Davidson College, MARK WANLASS, NREL — We use a tightly focused laser along with optical and thermal imaging to measure the diffusion-driven, free-carrier distribution in a GaAs/GaInP heterostructure. We find that temperature profiles are broader than their luminescence counterparts. This observation is consistent with how the underlying recombination mechanisms depend on carrier density: the rate of heat generation should be approximately proportional to the density of carriers, while the radiative rate should scale with the density squared. We show that the square root of the light signal follows the heat profile, giving consistent, independent measurements of the local carrier density.

¹Acknowledgment is made to the donors of the American Chemical Society - Petroleum Research Fund for support of this research.

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Date submitted: 16 Nov 2010

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