Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Recombination dynamics of excitons bound to nitrogen isoelectronic centers in GaAs PHILIPPE ST-JEAN, GABRIEL ÉTHIER-MAJCHER, École Polytechnique de Montréal, JOHN F. KLEM, Sandia National Laboratories, SÉBASTIEN FRANCOEUR, École Polytechnique de Montréal — Using time-resolved photoluminescence, we have studied the radiative recombination dynamics of excitons bound to single nitrogen dyads in GaAs. For in-plane dyads of C_{2v} symmetry considered in this work, the lifetime of all four allowed optical transitions, polarized either along or perpendicular to the dyad, decreases with temperature. Over the temperature range studied, the lifetimes of transitions of same polarization remain highly similar, but they are sensitively longer for transitions polarized along the dyad. These results indicate that 1) the spatial orientation of the exciton wavefunction is an important factor in the recombination dynamic, 2) the transfer dynamics between bright states appears negligible, and 3) the transfer to or from dark states is not significant for temperature over 5 K. These findings enhance the understandings of isoelectronic centers which are promising candidates for the implementation of atomic size memories based on a single charge or spin.

Philippe St-Jean
École Polytechnique de Montréal

Date submitted: 07 Dec 2011 Electronic form version 1.4