Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Single nitrogen dyad magnetoluminescence in GaAs C. OUELLET-PLAMONDON, S. MARCET, Genie Physique, Ecole Polytechnique de Montreal, Montreal (Qc), H3C 3A7, Canada, J.F. KLEM, Sandia National Laboratories, Albuquerque, New Mexico 87185, USA, S. FRANCOEUR, Genie Physique, Ecole Polytechnique de Montreal, Montreal (Qc), H3C 3A7, Canada — We report a study on the excitonic states of single nitrogen dyads in GaAs by magneto-photoluminescence. For light emitted along the [001] direction, a dyad of C_{2v} symmetry oriented along [110] shows four excitonic optical transitions that are linearly polarized along and perpendicular to the dyad. As expected, a magnetic field does not induce additional splitting, but all transitions are subject to a Zeeman and a diamagnetic shift. The energy and transition probabilities of all excitonic states were modeled using a Hamiltonian fully accounting for the C_{2v} symmetry. We determine the electron g-factor as well as the isotropic and anisotropic interaction factor for the hole. The diamagnetic shift allows us to calculate an electron radius of 16.2 Å, confirming the strong localization of the electron at the dyad. Finally, some dyads observed emitted at an energy smaller than others, exhibited no exchange interaction splitting and were fully degenerate at zero field. This emission is tentatively assigned to a bound trion state.

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Date submitted: 18 Nov 2009 Electronic form version 1.4