Excitons, biexcitons, and trions in self-assembled (In,Ga)As/GaAs quantum dots: Recombination energies, polarization, and radiative lifetimes versus dot height

$$|\Psi^{(\nu)}(\;)\rangle \quad \sum_{\kappa} C_{\kappa}^{(\nu)}(\;)|\Phi_{\kappa}(\;)\rangle \qquad (\;)$$

$C_{\kappa}^{(\nu)}(\;)$ ... κ

$(\mu\mu)$ ... $(\mu\mu)$

$$(\mu\mu') \quad \int\int \mathbf{R}\,\mathbf{R}'\,[\psi^{(\mu)}(\mathbf{R})]\,[\psi^{(\mu')}(\mathbf{R}')]\,[\psi^{(\mu')}(\mathbf{R}')][\psi^{(\mu)}(\mathbf{R})]$$

[illegible]

C. Binding energies

[illegible]

$$\Delta(\ ) \quad [\mathcal{E}^{(\ )} + \mathcal{E}^{(\ )}] + E^{(\ )}(\ )$$

$$\Delta(\ ) \quad [\mathcal{E}^{(\ )} \ E^{(\ )}(\ )] + E^{(\ )}(\ )$$

$$\Delta(\ ) \quad [+ \ \mathcal{E}^{(\ )} \ E^{(\ )}(\ )] + E^{(\ )}(\ )$$

$$\Delta(\ ) \quad E^{(\ )}(\ ) + E^{(\ )}(\ ) \qquad (\ )$$

[illegible]

$$(\quad) \quad \mathcal{N} \quad \{ + [E^{()}(\quad) + E^{( )}(\quad)] \quad B \} \qquad (\quad)$$

( )

$|\Psi^{()}(\quad)\rangle$ $\mathcal{N}$

$\Sigma (\quad)$ B

e [ ] **e** [-]

λ

$$\lambda(\quad) \quad ([\quad])(\quad) + ([- \quad])(\quad \alpha$$

$|\Psi^{()}(\;)\rangle$

$\rightarrow |\Psi^{(e)}(\; + \;)\rangle$

$(\;)$

VI. SUMMARY

ACKNOWLEDGMENTS

94

26

34

25

63

21

68

90

114

280

( )

60 ( )

16 ( )

67 ( )

( )

65 ( )

F ( )

68 ( )

63

( )

72

( ) ( )

98

( )

58 ( )

( )

2002