

Electronic structures of (In,Ga)As/GaAs quantum dot molecules made of dots with dissimilar sizes

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Abstract: We study the electronic structure of (In,Ga)As/GaAs quantum dot molecules (QDMs) made of two dots with dissimilar sizes. The results show that the energy levels of the QDMs are split into two groups, one group is dominated by the larger dot and the other by the smaller dot. The energy levels of the QDMs are also split into two groups, one group is dominated by the larger dot and the other by the smaller dot. The energy levels of the QDMs are also split into two groups, one group is dominated by the larger dot and the other by the smaller dot.

... $\mathbf{I} = \mathbf{I} - \mathbf{t} \mathbf{t}^T$, $\mathbf{M} = \mathbf{M} - \mathbf{t} \mathbf{t}^T$... $\mathbf{S} = \mathbf{S} - \mathbf{t} \mathbf{t}^T$...

$$\frac{1}{2} \nabla^2 + V_{\mathbf{r}} \mathbf{r} = i \mathbf{r}, \quad (1)$$

... $\mathbf{R}_n + V_{\mathbf{r}} \cdot \mathbf{I} = \mathbf{R}_n$... $\mathbf{I} = \mathbf{I} - \mathbf{t} \mathbf{t}^T$... $\mathbf{I} = \mathbf{I} - \mathbf{t} \mathbf{t}^T$... $\mathbf{I} = \mathbf{I} - \mathbf{t} \mathbf{t}^T$... $\mathbf{I} = \mathbf{I} - \mathbf{t} \mathbf{t}^T$...

$$H = \hat{p}_i \hat{p}_i$$

$$\frac{t}{t_w} = \frac{t}{t_g} = \frac{t}{t_g} E_X = 1156 \mu_V$$

Sum of ... $2t M$... $2t M$
... H w , t -
... I A3/G A3 QDM,⁹ ...

... $J'_{TT} = J'_{BB} = J_{TT} + J_{BB} / 2$ M E . 9 .
 M ... ideal ... -QDM, wt ...
 ... $e'_T = e'_B = e_T + e_B / 2$
 ... $J'_{TT} = J'_{BB} = J_{TT} + J_{BB} / 2$ M E . 9 .
 ... Q_{TT} ... Q_{BB} ...
 ... $d = 4.5 \mu$... $d = 10 \mu$...
 ... $Q_{TT} = M$... Q_{BB} ...
 ... e_T, e_B ... $2t$...
 ... $d = 7 \mu$... $d = 4.5 \mu$...
 ... e_B, e_T ... $d = 2t$...
 ... Q_{TT}, Q_{BB} ... $d = 2t$...
 ... e_B, e_T ... $d = 7 \mu$...
 ... Q_{TT}, Q_{BB} ... $d = 4.5 \mu$...
 ... e_B, e_T ... $d = 2t$...

$$= \begin{pmatrix} 0 & c_3 & 0 & c_1 \\ c_3 & 0 & c_2 & 0 \\ 0 & c_2 & 0 & c_4 \\ c_1 & 0 & c_4 & 0 \end{pmatrix} \quad 14$$

$$i, j = e_T^\uparrow e_B^\downarrow$$

B. Degree of entanglement vs double occupation

E

$$|g\rangle = c_1 e_T^\uparrow e_B^\downarrow + c_2 e_B^\uparrow e_T^\downarrow + c_3 e_T^\uparrow e_T^\downarrow + c_4 e_B^\uparrow e_B^\downarrow$$

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$$c_1^2 + c_2^2 + c_3^2 + c_4^2 = 1. \text{ At } |g\rangle, w$$

$$|g\rangle = \sum_{ij} \rho_{ij} i \otimes j, \quad 13$$

-QDM'7
 -QDM'7
 -QDM'7

 -QDM'7, t 7, l - t l u l , l t l 7
 -QDM'7 t t t-1 l t l 7 t l ,
 C 7 , t l , t

 -QMD t l , t t
 , w 7
 t
 I 7 u u t t QDM w l l 7
 t t w - l t

l w t t l u t t t w l -
 t

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L.H. . . . w l , 7 7 t u t C 7 N t . . .
 F . . . l R 7 P , u t I t F 7
 H . 7 I l t 7 . . . u t C 7 A u
 . . . t N t . N t . S . F , t
 C . G t N . 10674124 . I w . . . t NREL w 7
 . . . t MS.D t u t E , , O . S . .
 B 7 E , S . . , M t l 7 S . 7 E , . . .
 LAB-17 t t , . . . C t t N . DE-AC36-
 99GO10337 t NREL.

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