$\|A\|_{\mathcal{A}}\leq \frac{a}{2},\quad \ \ \forall\;c\;|\;c\in\mathbb{R}^2, \quad R_{q_1},R_{q_2},\quad R_{q_3},\quad c\in\mathbb{R}^2, \quad c\in\mathbb{R}^2, \quad c\in\mathbb{R}^2, \quad c\in\mathbb{R}^2.$ 

 $I_{\mathbf{A}}(x) = \mathbf{A} \mathbf{B} \mathbf{A} + \mathbf{A} \mathbf{B} + \mathbf{A} \mathbf{A}$  $f(x) = \frac{1}{2}x^2 - \frac{1}{2}x + \frac{1}{2}x - \frac{1}{2}x^2 - \frac{1}{2}x$ 

 $H_{\mathbf{G},\mathbf{G}'} = -\mathbf{G}$   $H_{\mathbf{G},\mathbf{G}'} + \sum_{\mathbf{G} \in \mathbf{G}} \mathbf{G} - \mathbf{G}'$   $H_{\mathbf{A},\mathbf{G}'} \circ \mathbf{G} = \mathbf{G}$ 

## **Table II. Critical Sizes (in ML) for the Direct/ Indirect Crossover in Free-Standing GaAs Quantum Films, Wires, and Dots20**







Fig. 5. Schematic illustration of the band alignment for quantum dots constructed from a direct gap material embedded within a matrix with a direct band gap. The bulk band energies are shown with solid lines and the confined electron and hole levels are shown by dashed lines. The conduction and valence band offsets are marked as  $\Delta E_{\alpha}$  and  $\Delta E_{\nu}$ . The energetic effects of quantum confinement (QC) and strain are

 $T_{\rm eff}$  is in Fig. 5.  $T_{\rm eff}$  ,  $\mathbf{u}_1$  ( $\mathbf{v}_2$ ) tushes electron levels up and hole levels up and hole levels up and hole levels up and hole levels up and  $\mathbf{v}_2$  $\alpha$  down. The effect of strain is as follows. The dot states is as follows.  $d_1$   $\sum_{i=1}^n d_i$  conduction state  $\sum_{i=1}^n d_i$  state  $\sum_{i=1}^n d_i$ 

 $\epsilon_{\Gamma_{\rm L}}$ 

*positive* 



larger than the calculation  $\mathcal{A}$  is the critical size.  $\mathcal{R}_{\lambda}$  the strongly localized with the wine,  $\mathcal{R}_{\lambda}$  is  $\mathcal{R}_{\lambda}$ it is clear that the Bloch function corresponding to the Bloch function  $t$  $1\leq k\leq n-1$ c derived CBM in the smaller wire has a different wire has a

 $\frac{4x^3}{x^2}$  ,  $\frac{2}{x^2}$  ,  $\frac{2}{x^2}$  ,  $\frac{1}{x^2}$  ,  $\frac{1}{x^2}$  ,  $\frac{1}{x^2}$  ,  $\frac{1}{x^2}$  ,  $\frac{1}{x^2}$  ,  $\frac{1}{x^2}$  ,  $\frac{1}{x^2}$ 

10. (2)  $\frac{2}{3}$   $\frac{3}{2}$   $\frac{3}{2}$   $\frac{3}{2}$   $\frac{3}{2}$   $\frac{3}{2}$   $\frac{1}{2}$   $\frac$ 

 $\mathbf 1$ 



$$
-4\mathbf{1}_{\mathbf{A}}\
$$

421

indirect gap is the GaAs/AlAs system. As the lattice  $c_1$  and  $c_2$  and  $c_3$  and  $c_4$  are almost identical, the almost identical, the almost identical, the almost intervals in  $\mathbb{R}$  $\mathcal{S}_{\alpha}$  strain free.  $\mathcal{S}_{\alpha}$  shows a set of of  $\mathcal{S}_{\alpha}$  shows a set of  $\mathcal{S}_{\alpha}$ pseudopotential calculations  $\mathcal{A}_{\mathcal{A}}$  for  $\mathcal{A}_{\mathcal{A}}$  for  $\mathcal{A}_{\mathcal{A}}$  $\mathcal{F}$ ,  $a_n = a_0$ ,  $a_{n+1}$ ,  $a_n = a_n$  ,  $a_n$  $\mathcal{A}_{\alpha\beta}$  ,  $\mathcal{A}_{\alpha\beta}$  is the conduction band of the  $\mathcal{A}_{\alpha\beta}$  with  $\mathcal{A}_{\alpha\beta}$ Below dc

 $F_{\rm eff}$  shows the highest energy hole and lowest energy hole and lowest energy hole and lowest energy hole and lowest  $e_n$ energy electron states for two  $\mathcal{A}_\kappa$  $f_{\mathcal{A}} + \dots$ Ò,

 $i \in \{1, 2, \ldots, 8, \ldots, 7, 11, 8, 4, 11, \ldots, 7, 11, 6, \ldots, 8, \ldots\}$  $\begin{bmatrix} \mathbf{P}_{11} & \mathbf{P}_{22} & \mathbf{P}_{33} & \mathbf{P}_{34} & \mathbf{$  $t_{\rm{max}}$  region production and  $\tilde{t}_{\rm{max}}$  and  $\tilde{t}_{\rm{max}}$  11c and 11 d plot the CBM and VBM  $\frac{1}{2}$  superlation in P( $\frac{1}{2}$  superlation in the reduction in the red  $t_1$  the  $t_2$  the  $t_3$  regime  $t_4$  of  $t_5$  increased the  $q$  $t = \tau_A + \tau_A + \tau_B + \tau_B + \tau_B + \tau_B$  $I_1$ , pushing it above the  $I_2$  derived state in the GaP derived stat  $\mathcal{R}_1$  and  $\mathcal{R}_2$  indirect gap. *Indirect Gap Dots: InP/GaP*

 $I_1$   $I_2$  +  $\frac{d}{dt}$  +  $\frac{d}{dt}$  dots,  $I_1$   $I_2$   $I_3$   $I_4$   $I_5$   $I_6$   $I_7$   $I_8$   $I_9$   $I_1$  $\mathcal{L}_{\mathcal{A}}$  ,  $\mathcal{L}_{\mathcal{A}}$  using the Stranski-Krastanow technique techniques the Stranski-Krastanow techniques in  $\mathcal{L}_{\mathcal{A}}$  $a_n \rightarrow b_n$  optical properties  $a_n$  between  $b_n$  $\mathcal{F}_{\text{t}}$  ,  $\mathcal{F}_{\text{t}}$  recent photological ph  $1220$  (



2<br> $\frac{1}{4}$  will  $\frac{1}{4}$  which  $\frac{1}{4}$  wants  $\frac{1}{4}$  will be the  $\frac{1}{4}$  wants of  $\frac{1}{4}$  wants  $\frac$ 

## $45 - 8$ <sub>1</sub>  $\frac{1}{2}$  in  $\frac{1}{2}$  in  $\frac{1}{2}$  in  $\frac{1}{2}$  in  $\frac{1}{2}$

 $4. \ldots$ ,  $1. \ldots$ ,  $1. \ldots$ ,  $\frac{3}{4}$ ,  $\frac{2}{3}$ ,  $\frac{1}{2}$ ,  $\frac{3}{4}$ ,  $\ldots$ ,  $\frac{3}{2}$ ,  $\frac{9}{2}$ ,  $\frac{9}{2}$ ,  $\ldots$ *Lett.*,  $\mathbb{Z}(\mathfrak{A})$ .  $\mathcal{F}$ . J. Prieto, G. Armelles, T. Utzmeier, F. Briones, F. Bri  $\ddot{P}$ ,  $\dot{P}$ ,  $\dot{P}$ ,  $\dot{P}$ ,  $\ddot{P}$ ,  $\dot{P}$ ,  $\ddot{P}$ ,  $\ddot{$  $(1, 3)$ .  $\ldots$   $\lambda$ <sub>3</sub>,  $\ldots$   $\ldots$  3,  $\ldots$   $\ldots$  *Phys. Rev. B* 56 1  $(1)$ .  $Phys. Rev. Lett. \quad 0, 1, 1 \quad (1, 55).$  $8.$  R. Leon,  $8.$  R. Leon,  $1.$  R. Leon,  $1.$   $\mathbb{R}$ ,  $\mathbb$  $R_1$ ,  $\tilde{\lambda}$ ,  $\tilde$ *Phys. Lett.*  $2,1$   $\mathbb{R}$   $(1,8)$ .  $\frac{9}{2}$ .  $\frac{1}{2}$ . Appl. Phys. *Lett*  $\hat{2}$ ,  $\hat{1}$   $(1 - \hat{3})$ . 10.  $\ldots$ ,  $\vdots$ ,  $\mathbf{k}$ .  $\ldots$ ,  $\mathbf{k}$ .  $\mathbf{k}$ .  $\mathbf{k}$ .  $\mathbf{k}$ .  $\mathbf{k}$ .  $\mathbf{k}$ .  $\mathbf{k}$ . *Phys. Chem.*  $\bullet$ ,  $(1)$ . 11.  $\ldots$   $\ldots$   $\ldots$   $\ldots$   $\ldots$   $\ldots$   $\ldots$   $\ldots$   $\ldots$  *Phys. Rev. Lett.*  $\ldots$  $3(1)$ .  $12.$   $+7.$   $-8.$   $-8.$   $-12.$   $-12.$   $+7.$   $-8.$  $\mathcal{A}_{\mathcal{A}}$ , *Appl. Phys. Lett.*  $\mathcal{A}_{\mathcal{A}}$  1  $\mathcal{I}(1)$ .  $1 \cdot \cdot \cdot \cdot \cdot$ ,  $3 \cdot \cdot \cdot$ ,  $2 \cdot \cdot \cdot$ ,  $3 \cdot \cdot \cdot$ , *Phys. Rev. Lett.*  $, 2.5$ <sup>c</sup> $(1 1)$ . 14. Landolt and Börnstein, *Numerical Data and Functional Relationships in Science and Technology, 22, 5, 30*  $\left($ ,  $\mathbb{R} \right)$   $\mathbb{R}$ ,  $\left( \mathbb{R} \right)$ ,  $\mathbb{R}$ ,  $\left( \mathbb{R} \right)$ .  $1.7 \times 10^{-4}$   $\lambda_{\rm crit}$ , J. K.,  $\lambda_{\rm crit}$ ,  $\lambda_{\rm eff}$ ,  $\lambda_{\rm eff}$ ,  $\lambda_{\rm eff}$ ,  $\lambda_{\rm eff}$  $u_{\rm{u}} + \frac{1}{2} \sum_{i=1}^{n} u_{i} + \frac{1}{2} \sum_{i=1}^{n} u_{i}$  $1,\quad \widehat{1},\quad \jmath$ , J.,  $\jmath$ ,  $\j$ *J. Appl. Phys.* **6**, 2.7.**6** (1<sup>-8</sup>). 1.  $\therefore$   $\frac{3}{2}$ ,  $\frac{3}{2}$ ,  $\therefore$   $\frac{1}{2}$ , *Phys. Rev B.* -1, 1  $\therefore$  1. -7. 1<sup>8</sup>.  $\frac{1}{2}$ ,  $\frac{2}{3}$ ,  $\frac{3}{4}$ ,  $\frac{1}{2}$ ,  $\frac{1}{2}$ , *J. Chem. Phys.* 100, 2(1). 19. L.W. Wang and A. Zunger, *Semiconductor Nanoclusters*