t   t   -   t   t

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InAs/GaAs

electrons   *holes*

electron loading   *hole loading*

$J \simeq$ 10 eV

500 1000 Å
$s, p, d, \ldots$

$\simeq 200 \times 40$ Å
InGaAs/GaAs-

$J_{ee} \simeq$ 20 meV   *smaller* $\Delta\epsilon \simeq$ 50 − 70 meV $J_{hh} \simeq$ 15 − 25 meV $\Delta\epsilon \simeq$ 10 − 20 meV-

InGaAs/GaAs

$p, p \quad p, d$

J_{ij} K_{ij}

i j-

$\Delta(N-1, N)$

Γ X L

$\Delta_{\mathrm{HF}}(N-1, N)$-

$\delta_{p1,p2}$ $\delta_{p2,d1}$

$^1\Delta$ $^2\Delta$ $^1\Sigma^*$

$\delta_{p1,p2}$

$\delta_{p2,d1}$

d

p d

p

p p_2

d_1 δ_{p_2,d_1}

J_{ss}

$\delta_{p_1,p_2} \sim (0.3 - 0.5)J_{ss}$ $\delta_{p_2,d_1} \sim (0.2 - 0.3)J_{ss}$

$\delta_{p1,p2} \sim 0$ $\delta_{p2,d1} \sim J_{ss}$

d

p

δ_{p_2,d_1}

p_1 $L_z = +1$ $L_z = -1$

$B = 0$

p_2 $L_z = +1$ $L_z = -1$ d_1 d_2 $L_z = +2$ $L_z = -2$