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Inter-dot Effects in a Chain of CdS/CdSe/CdS Quantum Well Quantum Dots[1] JOSEPH PINGENOT, Center for Semiconductor Physics in Nanostructures, The University of Oklahoma, KIERAN J. MULLEN — Although individual quantum well quantum dots (QWQD)s have been studied extensively, regular arrays of QWQDs have not received as much attention. Previous theoretical work on single electrons in a regular array of rings has shown antiferroelectric electron ordering, indicating the possibility of creating systems with antiferroelectric ordering in systems such as QWQDs. We have studied theoretically a chain of identical CdS/CdSe/CdS QWQDs with well thicknesses between 42nm and 10nm, with an external barrier width of 14nm. QWQD cores were between 14nm and 38nm, respectively. Valence and conduction states were calculated for a single QWQD using 8-band k-dot-p theory on a realspace grid using a program developed by Pryor[2]. The potential from the two nearest neighbors was found from the conduction state. For electron-hole interactions, the uppermost valence state of all 3 QWQDs were included. The holes were much more localized than the electrons, causing a large potential around them. A nonsimple potential arises from the combined states. The states were sensitive to the roughness of the sphere. [1]PRB 78 075411 [2] PRB 72 205311

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