

Differential geometry and dimension reduction for nano structures

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Many nano structures are essentially one or two dimensional and it is in this case often possible to reduce the equations from three to one or two dimensions. That gives huge computational savings but can also provide insight into how the geometry of structures influences the physical properties. In the case of the Schrödinger equation for a single particle this influence is expressed in the form of a simple curvature potential. For coupled equations such as the Luttinger-Kohn Hamiltonian the procedure it is no longer straight forward. The boundary conditions pose some problems and an extra approximation is necessary. We will give an overview of the method and point to some of the possible pitfalls when a choice of frame is needed.