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Quantum confinement in P doped Si nanowires and nanofilms[1] JIAXIN HAN, TZU-LIANG CHAN, JAMES CHELIKOWSKY, University of Texas at Austin — Functionalized Si nanowires have been synthesized and used as interconnects in electronic circuits or building blocks for semiconductor nanodevices. Likewise, thin films of silicon have been incorporated in transistor applications. In order to understand how doping operates in these nanostructures, we employed a real-space pseudopotential method to study P-doped Si nanostructures. We will examine the size dependence of the electronic binding energy for the P donor level in nanowires and nanofilms as function of size and dimensionality. In particular, we will present results for P doped Si [110] nanowires as function of the wire diameter and P doped Si [111] nanofilms as a function of the film thickness.

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