Electronic Spectrum of Superlattice Wires[1] FREDY ZYPMAN,
Yeshiva University — We consider superlattice nanowires, and find an exact solution to the model-independent quantum Hamiltonian. We obtained a closed-form
solution to this problem. The energy levels for general interatomic interactions are
calculated in the context of the Hubbard model. We obtain an explicit formula
for the function whose roots render the energy states. The corresponding energy
bands can be tuned by the usual superlattices concept of pattern control but also,
in the case of nanowires, by controlling the interatomic separation of the structure.
We apply our results to nanowire tunneling diodes, angle-resolved photoemission
spectroscopy, and Si-Ge superlattice nanowires.

[1]Work supported by Research Corporation.

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