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Suppression of Coulomb exchange energy in quasi-2D spin-3/2 hole systems R. WINKLER, Northern Illinois University, T. KERNREITER, M. GOVERNALE, U. ZÜLICHE, Victoria University of Wellington, New Zealand — We have calculated the exchange-energy contribution to the total energy of quasi-2D spin-3/2 hole systems in typical semiconductors [1]. The magnitude of the exchange energy turns out to be suppressed from the value expected for analogous spin-1/2 conduction electron systems whenever the mixing between heavy-hole and light-hole components is strong. Our results are obtained using a general formalism for calculating the exchange energy of many-particle systems where single-particle states are multicomponent spinors. We have applied this approach to obtain analytical results for spin-3/2 hole systems in limiting cases.
[1] Kernreiter et al., Phys. Rev. B **88**, 125309 (2013).

Roland Winkler
Northern Illinois University

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