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Renormalization group study of interaction effects in Rashba-type tight-binding models GIULIO SCHOBER, MANFRED SALMHOFER, University of Heidelberg — The interplay between Rashba-type spin splitting and electron-electron interactions is studied using the functional renormalization group. Our starting point is an effective tight-binding model for the spin-split lowest conduction bands of BiTeI. The giant spin splitting of bulk energy states in this semiconductor arises as a consequence of strong atomic spin-orbit coupling and the noncentrosymmetric crystal structure. By successively integrating out high-energy degrees of freedom we investigate the competition between Fermi liquid instabilities focusing on unconventional superconductivity. The vertex function is efficiently parametrized in an N-patch scheme which takes into account the most relevant momenta on the Fermi surface and realizes a flow of effective interactions with broken SU(2) symmetry. Abstracting from the concrete material, we further study a class of minimal tight-binding models on the hexagonal Bravais lattice with Rashba-type dispersions near several time-reversal invariant momenta in the first Brioullin zone.

Giulio Schober
University of Heidelberg

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