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Hartree-Fock theory of a homogeneous 2D electron gas with Rashba spin-orbit STEFANO CHESI, GABRIELE GIULIANI, Department of Physics, Purdue University — The interplay of electron-electron interactions and Rashba spin-orbit in a 2D electronic system is studied within the Hartree-Fock approximation. We consider homogeneous states parameterized by a "generalized chirality" and characterized by an arbitrary orientation of the local electron spin quantization axis in **k** space. We have studied the phase diagram in the space spanned by the electronic density and the strength of the spin-orbit coupling. The existence of paramagnetic chiral states with renormalized occupation is proved at both high and low density, while a spin polarized chiral state with nontrivial spin texture exists at intermediate densities. Interestingly the latter is constructed out of single particle wavefunctions that, at variance with the corresponding situation in the absence of spin-orbit coupling, are not solutions of the non interacting hamiltonian. A classic analog for this problem is provided by a system of interacting magnetic dipoles for which the spin-orbit coupling acts as an effective magnetic field.

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