Atomic scale properties of chiral spin-triplet pairing at the interface with normal or magnetic systems

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We analyse the atomic scale behaviour of chiral spin-triplet pairing at the interface with different types of electronic orders. Starting from the interface with a normal metal we consider the evolution of the superconducting order parameter for various types of ferromagnet (including half-metal in the presence of spin-active interface), for a system with tendency to metamagnetism as well as when a magnetic field is applied. The study is performed by solving self-consistently the Bogoliubov-De Gennes equations on a lattice or by linking the modification of the electronic structure in proximity of the interface to the change in the strength of the long-range order. Concerning the proximity with a ferromagnetic (F) system we are able to check its universal character with respect to the nature of the ferromagnet by comparing the case of a F state due to a Stoner type of exchange and that one driven by a spin dependent asymmetry of the electronic bandwidth. Moving to the regime of half-metallicity we show that the breakdown of the superconductivity at the interface is independent of the mechanism that generates the F order for non magnetic interfaces, whereas spin-active barriers interfere with the chiral pairing leading to extra subgap Andreev states. Finally, the application of a magnetic field can drive a transition to a spatially inhomogeneous Fulde-Ferrell-Larkin-Ovchinnikov state, where chirality disappears and a singlet-triplet mixing takes place. A link with the physics of Sr_2RuO_4 and related eutectic phases is also discussed.