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Hidden Order as a Source of Interface Superconductivity[1] ANDREAS MOOR, ANATOLY VOLKOV, KONSTANTIN EFETOV, Institut für Theoretische Physik III, Ruhr-University Bochum — We propose a new mechanism of the interfacial superconductivity observed in many heterostructures composed of different materials including high-temperature superconductors. Our proposal is based on the use of the Ginzburg–Landau equations applicable to a wide class of systems. The system under consideration is assumed to have, alongside the superconducting order parameter, also another competing order that might be a charge- or spin-density wave. At certain temperatures or doping level the superconducting state is not realized (thus, "hidden"), while the amplitude of another order parameter corresponds to a minimum of the free energy. We also assume that at an interface or at a defect, the non-superconducting order parameter is suppressed (strongly or weakly), e.g., due to an enhanced impurity scattering. The local superconductivity is shown to emerge at the interface, and the spatial dependence of the corresponding order parameter is described by the Gross–Pitaevskii equation. The quantized values of the temperature and doping levels, at which $\Delta(x)$ arises, are determined by the "energy" levels of the linearized Gross–Pitaevskii equation, i.e., of the Schrodinger equation. Interestingly, the local superconductivity arises even at a small suppression of the rival order.

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