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On the Bogolubov-de Gennes Equations of Superconductivity

In this talk, I describe recent results on the Bogolubov-de Gennes equations. These equations give an equivalent formulation of the BCS theory of superconductivity. I discuss general features of the equations and key physical classes of solutions (normal, superconducting, vortex and vortex lattice states). I describe results on existence of the normal, superconducting and vortex lattice states for non-zero magnetic fields and stability/instability of the normal states for large/small temperature or/and magnetic fields.