MICROSCOPIC FOUNDATIONS OF THE MEISSNER EFFECT - THERMODYNAMIC ASPECTS

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In a joint work with Jean-Bernard Bru we analyze the Meissner effect from first principles of quantum mechanics. We show in particular the existence of superconducting states minimizing the magnetic free-energy of a BCS-like model and carrying surface currents which annihilate the total magnetic induction inside the bulk in the thermodynamic limit. This study is a step towards a complete explanation of the Meissner effect from a microscopic model. It remains indeed to show that those states are dynamically stable, i.e., quasi-stationary at low temperatures.