



PHYS2420 Special questions in solid state physics

[22.5h]

This two-yearly course is taught in 2006-2007, 2008-2009,...

This course is taught in the 1st semester

Teacher(s): Luc Piraux
Language: French
Level: Second cycle

Aims

Study of the superconductivity phenomenon in solids; lab demonstrations

Main themes

1. Main experimental phenomena associated to the superconducting state
Zero resistance state, Meissner effect, critical field, energy gap, isotopic effect, type I and type II superconductors
2. Theoretical explanations of superconductivity
London equations, BCS theory, Ginsburg-Landau theory, scaling lengths in superconductivity, thin films and wires
3. Macroscopic quantum phenomena
Flux quantization in superconducting ring, Josephson effect, quantum interference, SQUID magnetometry
4. Mesoscopic superconductivity
Effect of confining, unusual properties of superconducting nanowires and dots,

Other information (prerequisite, evaluation (assessment methods), course materials recommended readings, ...)

Prerequisites: Advanced general physics (2nd part: Physics of solids, PHYS 2263), or Physical electronics (ELEC 2330), or Physics of materials (MAPR 2492).

Other credits in programs

MATR22	Deuxième année du programme conduisant au grade d'ingénieur civil en science des matériaux	(2 credits)
MATR23	Troisième année du programme conduisant au grade d'ingénieur civil en science des matériaux	(2 credits)
PHYS22/G	Deuxième licence en sciences physiques	(3 credits)