



SC

**PHYS2420 Questions spéciales de physique de l'état solide**

[22.5h] 3 credits

This two-yearly course is taught in 2004-2005, 2006-2007,...

This course is taught in the 1st semester

**Teacher(s):** Luc Piraux  
**Language:** french  
**Level:** 2nd cycle course

**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 credits in programs**

**PHYS22/G** Deuxième licence en sciences physiques (3 credits)