

## **Lasers Physics (3 ECTS)**

*Teachers: Alberto Bramati (Laboratoire Kastler Brossel, SU) and Catherine Schwob (INSP, SU)*

This course presents the basics of matter-radiation interaction and introduces the optical gain processes that enable the laser effect. The operating principles of lasers are explained and illustrated by examples of high-performance lasers used in spectroscopy and metrology.

### **Contents:**

- gaussian modes
- optical resonant cavity, electromagnetic field loop condition  
cw laser, spectral behaviour, modes and emission frequencies, linewidth.
- dynamics of laser: lifetime of the field in the cavity, damping of the cavity, relaxation oscillation, Q-switch laser, modes locked laser
- different kinds of lasers