

# Atoms and photons

- ▶ **The team:** H el ene Perrin (13 courses), Cl ement Sayrin and Tarik Yefsah (13 exercise classes)
- ▶ **Topic:** light-matter interaction in the semi-classical and quantum regimes, light field quantization
- ▶ **Course programme:**
  - Einstein's coefficients
  - semi-classical approach (interaction, atom and field relaxation, optical Bloch equations)
  - field quantization (field operators, Fock states, coherent states, relaxation)
  - quantum field coupled to quantum matter (photodetection, dressed states, cavity quantum electrodynamics. . . )
- ▶ **Exercice classes** based on research papers: absorption in the saturation regime, laser cooling, EIT, quantum optomechanics, etc.
- ▶ **Exam:** written exam ( $\sim 3$  hours).

