

# Ultrafast dynamics in atoms and molecules in intense fields (3 ECTS)

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## **Objectives of the course:**

Ultrafast phenomena represent an important part of atomic and molecular physics and deal with small systems interacting with strong and ultrashort electromagnetic fields. The latter could be obtained either with laser or through collisions with very highly charged ions. The main objectives of this course are to introduce a number of fundamental aspects that are used to predict, describe and analyze the highly non-linear response of these systems. Experimental and theoretical (analytical and numerical) methods to study the processes involved will be extensively presented. Differences and similarities will be exemplified throughout the course.

## **Contents :**

- Introduction to laser-matter interaction as well as collisions with an emphasis on timescale.
- Atomic/molecular processes involved in the different interactions.
- Main features of experimental investigations: beams (particles and laser, either table-top or large facilities) and detection (light or electron/ion spectroscopies).
- Femtochemistry and attoscience
- Presentation of a few applications.

**Place :** Paris (Jussieu)