

Non-equilibrium and radiation



Niveau d'étude
BAC +5



ECTS
3 crédits



Composante
UFR Sciences
et Techniques

En bref

- **Langue(s) d'enseignement:** Français
- **Ouvert aux étudiants en échange:** Non

Présentation

Description

When temperature increases in gaseous and diphasic media, radiation begins to play a major role. Conversely to grey body radiation which can be known with only the medium temperature, the prediction of the radiation transport in gases implies the knowledge of (1) the internal structure of atoms and molecules, (2) the microscopic interaction processes between particles and between particles and light. Higher internal energy involves more excited levels and also a more complex chemistry. It is then necessary to be able to know the composition and the energy status of the medium depending on macroscopic parameters such as temperature and pressure. When microscopic characteristic times become much different from aerodynamic times, departure from equilibrium appears. Taking into account the evolution of nonequilibrium population along with the transport of radiation in the medium is then required.

Objectifs

As specific objectives, by the end of the course students should be able to:

- Understand atomic and molecular energy state structure in atoms and molecules
- Use spectroscopic notations and units
- Write equilibrium equations
- Calculate an equilibrium chemical composition
- Calculate the radiative properties of a gas
- Solve the radiative transfer equation in simple cases

Pré-requis obligatoires

- Structure atomique/moléculaire de la matière
- Equations différentielles
- Physique statistique
- Rayonnement thermique

Contrôle des connaissances

Contrôle continu + Examen terminal

Compétences visées

Small exercises and training activities begun during the tutorial classes have to be finished at home. Some of them could be collected, evaluated and a grade assigned. Teachers can only give some questions to study or some texts to read from one tutorial class to another. Close to 2/3 of the semester, an evaluation of the knowledges and skills is done in class.

Liste des enseignements

	Nature	CM	TD	TP	Crédits
Non-equilibrium and radiation	Matière				