Master Physique fondamentale et applications
Modern lasers and laser-matter interaction

Informations

Composante : Faculté des Sciences

Responsables

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Langue(s) d'enseignement

Anglais

Contenu

Part 1: Modern laser sources
- Nanosecond lasers and thermal problems in lasers (rate equations; spiking; q-switching; MOPA architecture; q-switch devices; injection seeding; beam quality of Gauss. Beams; peak fluence measurement; thermal lenses in lasers: rod laser, slab laser, thin disc laser, fiber laser)
- Ultrashort lasers (Definitions and timescales, Building a femtosecond oscillator, Amplifying a femtosecond pulse, Measuring a femtosecond pulse)

Part 2: Ultrafast laser-matter interaction
Interests of ultrashort pulses (intense and short), Mechanisms of interaction (from energy absorption to ablation), Ultrafast measurements (pump-probe), Optical breakdown, low-density plasma and microexplosion applications - Lab work

Part 3: Laser-matter interaction from ns to ms regime
A long pulse laser as heat source; thermal diffusion; heat affected zone;

Part 4: Some applications of laser-matter interaction
laser cutting; reactive cutting, drilling, welding; Laser damage measurements and models; "fatigue" effect; fusion class lasers.

Compétences à acquérir

Learn the physics and practical aspects of today's lasers and their application in material science.

Modalités d'organisation

This course is a classical lecture with some excercises.

Pré-requis obligatoires

Basic knowledge on lasers and solid state physics

VOLUME HORAIRE

- Volume total: 32 heures
- Cours magistraux: 32 heures

Codes Apogée

- SPFCU44J [ELP]

Pour plus d'informations

Aller sur le site de l'offre de formation...

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