

# High power laser technology

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Time: 4 x 45 mn = 3 h

This series of lectures aims at presenting the technologies commonly used in plasma physics. In particular, all the parameters intrinsic to the laser source will be defined and discussed. As presented, different technologies may provide different physical beam properties such as for instance pulse duration or contrast. The program is browsed below.

## Introduction

- Physical quantities
- Gaussian beams
- General laser architectures

## Oscillators:

- Optical cavities
- Laser oscillations and free running laser
- Pulsed regimes: Q-switch and Mode locking
- Carrier Envelop phase

## Laser Amplification:

- Gain
- Franz et Nodvik equations
- Amplifier architectures
- Chirped pulse amplification
- Examples

## Optical parametric amplification

- Non linear optics
- Parametric processes
- Phase matching
- Examples

## Metrology

- Time-frequency
- Temporal diagnostics
- Spatial diagnostics
- Spatio-temporal couplings