

Laurent Gallais

School Address

Ecole Centrale Méditerranée
Technopole de Chateau-Gombert
Marseille, France
laurent.gallais@centrale-marseille.fr
+33 6 20 98 69 46

Research Address

Institut Fresnel
Campus de Saint Jérôme
Marseille, France
laurent.gallais@fresnel.fr
+33 6 20 98 69 46

CURRENT POSITION

Professor, teaching in the field of Photonics and conducting research on Laser Material Interactions.

EDUCATION

Accreditation for Research Direction-HDR, Aix Marseille University
Title : Studies of laser damage effects on optical surfaces and coatings from the nano to femtosecond regime 2011

PhD, Aix Marseille University
Title : Laser damage in optical components: metrology, statistical and photo-induced analysis of precursor defects 2002

Master of Science, Ecole Nationale Supérieure de Physique de Marseille
Optics, Image and Signal 1999

Engineering Degree, Ecole Nationale Supérieure de Physique de Marseille
Physics 1999

TEACHING

1A, S5 & S6
Course Track: Wave and Signal (Lead: M. Alonso)
• Directed work (TD) : Fourier theory and the equations of physics ; Electromagnetic plane waves in free space and polarization ; Material response to electromagnetic waves: dispersion, refraction, reflection and guided waves ; 3D spatial propagation: diffraction and lenses.
• Practical work (TP) on Fourier Optics.

Course Track: Train'ing - Experiments in Optics (Lead: L. Gallais / F. Lemarquis/ N. Sandeau)
• Practical work (TP) on Holography.

Course Track: Train'ing - Introduction to Magnetic Confinement Fusion (Lead: L. Gallais / F. Schwander)
• COMSOL simulations of thermal loads on plasma facing components.

2A, S7
Course Track: Mechanics - Physics (Lead: E. Sarrouy / M. Alonso)
• Directed work (TD) : Matrix methods for rays and waves, optical systems, waveguides, lasers.

Course Track: Semi-Conductor Materials, Properties & Applications (Lead: L. Gallais)

- Lectures : basics of semiconductor physics, light-semiconductor interactions, applications in the field of light generation and detection (Telecoms, Lighting, photovoltaics).

Course Track: Material-Radiation Interactions (Lead: J. Bittebierre)

- Lectures : basics of laser / materials interactions and applications in research, medical, industry & defense.
- Practical work : COMSOL simulations of laser welding.

Course Track: Training - COMSOL simulations (Lead: L. Gallais)

- Initiation to Finite Elements Simulations and COMSOL Multiphysics software through practical case studies.

2A, S8

Course Track: Information Sciences and Digital Society (Lead: M. Roche)

- Lectures : Display systems ; Presentation of the basic notions on the science and technology of displays (LCD, OLED,...).

3A, S9

Course Track: PICSEL -Photonics, Image, Signal & Telecommunications (Lead: L. Gallais)

- Advanced lectures on laser technologies
- Advanced lectures on display technologies
- Student projects in collaboration with companies and academics

Executive Education

Custom training for professionals (Lead: J.M. Rossi)

- Laser safety
- Fundamental of Photonics

RESEARCH

Leading research activities on laser material interactions at [Institut Fresnel](http://www.fresnel.fr): Physics and laser material interactions and application to the field of laser damage of optical components and laser processing of materials and components.

PERSONNAL WEBPAGE: <https://www.fresnel.fr/spip/spip.php?article2683>

PhD student advisor

- Has supervised 19 PhD students, 4 ongoing, 15 defended.

Projects & Collaborations

- Leader of research projects with companies (Amplitude, Thales, Safran, Saint Gobain, EOLITE, CILAS, Cristal Laser and SMEs) and CEA dealing with laser processing or laser damage of optical components.
- Project Leader or local-coordinator of research agency funded projects (ANR, AMIDEX, H2020, Region PACA).
- Co-inventor in 5 patent families and project leader of innovation projects.

Papers & Communications

- 25+ invited talks in international conferences (ACS Glass and Optical Materials, SPIE Laser Damage, OSA Optical Interference Coatings, SPIE Pacific Rim Laser Damage, Frontiers of Optical Coatings,

Laser Sources and Applications- Photonics Europe, OSA Laser Application Conference, OSA Optical Fabrication Congress, PIERS...).

- 100+ Peered review papers.
- 200+ Conference communications

HONORS

Appointed Chair Professor at Ecole Centrale Méditerranée (2022)
MATLASE chair between CEA (Atomic Energy Commission) and ECM, with the objective to develop teaching, knowledge and skills around the properties of materials and their evolution under high temperature, based on high power lasers.

INTERESTS

Climbing, Cycling, Hiking, Sailing.