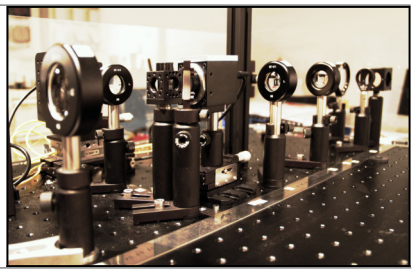
INSTITUT d'OPTIQUE GRADUATE SCHOOL | Continuing Education
Formation Continue

# EF2 | Basics of optics



LEVEL: BASIC

**Audience:** Engineers or senior technicians wishing to update their knowledge in optics or master the basics of optics

**Prerequisites:** Basic knowledge in mathematics and geometry

**Pedagogical manager(s):** Thierry Avignon - Responsable du LEnsE, chargé de cours à l'Institut d'Optique, Sébastien De Rossi - Enseignant-chercheur à l'Institut d'Optique

**Language of the training:** French

**Maximum capacity:** 12

**Price:** 2960€ HT - **Duration:** 2 x 4 days - 56 h

## Objectives

• Understand the principles of optical systems
• Design and set up a simple optical assembly
• Participate in the elaboration of the specifications of an optical instrument

## Next sessions

▶ 24 november 2020 au 27 november 2020 et 08 december 2020 au 11 december 2020 - Palaiseau

## Addressed topics

Geometrical optics
• Reflection and refraction of light rays
• Notions of rigorous and approximate stigmatism
• Simple optical elements and their combinations
Optical instruments
• Genral properties of instruments
• Basic instruments (telescope, microscope, projection lens)
• Basics of photometry in optical systems
Physical optics
• Wave aspect of light.
• Interference and diffraction
• Polarization



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# EF2 | Basics of optics

## The program

Geometrical optics
• Basic laws of light propagation - Reflection, refraction
• Approximation of linear optics (Gauss optics) - Mirrors, Lenses.
• Basic properties of the centered systems (focal, afocal, aperture)
• Experimental demonstrations: total reflection, image formation, imaging under Gauss conditions ...
Optical instruments
• General properties of optical instruments, examples
• Notion of focal length, magnification, angular magnification
• Pupil of an instrument, fields of view and depth of view
• Instrument Photometry Elements
• Experimental demonstrations: microscope, afocal telescope, projection lens
Physical optics
• Wave aspect, electromagnetic field, light vibration - Natural light, polarized.
• Interference: application to the characterization of optical system by interferometry.
• Diffraction and influence on the resolution of optical systems
• Influence of aberrations on the resolution of optical systems
• Experimental demonstrations: polarization, light interferences and diffraction, aberration
Labwork
• Paraxial measurements on optical systems - Image formation by lenses and mirrors
•Basic optical instruments: bezel, finder, collimator, microscope
• Measurement of geometric and chromatic aberrations
• Interferometric measurements on a Michelson, a Fizeau interferometer (Zygo)

## Methodology and assessment

Courses and exercises
Interactive experimental demonstrations
Labwork on instruments



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