INSTITUT d'OPTIQUE GRADUATE SCHOOL | Continuing Education
Formation Continue

SC9 | Design of optical imaging systems

LEVEL: ADVANCED

Audience: Engineer, project manager in R&D

Prerequisites: Basic knowledge in geometrical optics

Pedagogical manager(s): Eric Ruch - Ingénieur expert à REOSC

Language of the training: French

Maximum capacity: 12

Price: 2560€ HT - **Duration:** 2 x 3 days - 42 h

Objectives

- Understand the conventional optical system combinations and their applications
- Specify or size an optical system, write a specification
- Evaluate the performance of an optical system and optimize it.

Next sessions

- 20 march 2019 au 22 march 2019 et 03 april 2019 au 05 april 2019 - Palaiseau

Addressed topics

Basis on optical systems
- Photometry and radiometry

Analysis of an optical system
- Limit of resolution of optical systems

Classical optical combinations
- Dioptric and catadioptric systems, zoom, optical IR

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The program

Instrumental optics reminder
- Geometric characteristics of optical systems
- Magnification - Aperture - Resolution - Field of view - Depth of field
- Reminder about aberrations

Photometry
- Reminder on photometric quantities: flux, illumination, intensity, luminance, geometric extended
- Photometry instruments
- Reminder about cameras and matrix detectors

Analysis of an optical system
- Criteria qualities of an optical imaging system : defects of the wavefront, PSF, MTF
- Measurement methods of these criteria: star test, wavefront analyzers
- Basic principles in adaptive optics

Study conventional optical combinations
- Diopter systems: from simple lens objectives to high quality photographic objectives
- Catadioptric systems: telescope mirrors 2 or 3, on- and off-axis
- Lenses with variable focal (zoom)
- Optical systems for thermal infrared

Labwork
- Aberration measurements (star test)
- wavefront analysis (Zygo, Haso)
- FTM measurements (LSF, Foucault method)

Methodology and assessment

Lectures and exercices
Demonstrations in the lab
Labworks on instruments

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