

SC9 | Design of optical imaging systems



NIVEAU : INTERMÉDIAIRE

Publics : Engineer, project manager in R&D

Prérequis : Basic knowledge in geometrical optics

Responsable(s) pédagogique(s) : Eric Ruch - Ingénieur expert à REOSC

Langue de la formation : Français

Capacité maximum : 12

Prix : 2560€ HT - **Durée :** 2 x 3 days - 42 h

Objectifs

- ▶ 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.

Dates et lieu des prochaines sessions

- ▶ 20 mars 2019 au 22 mars 2019 et 03 avril 2019 au 05 avril 2019 - Palaiseau

Thèmes abordés

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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Le programme

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)

Méthodologie et évaluation

Lectures and exercices

Demonstrations in the lab

Labworks on instruments