

# Thermal Measurements in Two-Phase Systems

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Venue and date: **Biblioteca “Lorenzo Poggi”, DESTEC, Polo A**

- **September 13, 2024, 14:45-18:45**
- **September 20, 2024, 14:45-18:45**

Often one of the first tasks of a new PhD student is to operate or set up an apparatus to make measurements. A considerable amount of time is spent on connecting the sensors, programming the acquisition software, and learning how an instrument works. In addition, conducting experimental research requires a good level of confidence in error management and a minimal amount of experience with signals and electronics.

The course provides students with a basic knowledge of how to deal with measurements, with particular emphasis on thermal measurements of two-phase systems (liquid-vapor). Examples and technical specifications of acquisition boards commonly used in the laboratory are covered. Special emphasis is given to thermal measurements (temperature and heat flux), with an overview of contact, non-contact, and inverse techniques in two-phase systems. Advanced visualisation techniques are also introduced. The course concludes with a focus on the experimental error quantification.

Programme of the course:

**1. 4 hours, September 13, 2024, 14:45-18:45**

- a) Temperature measurements
- b) Heat flux measurements
- c) Inverse heat transfer problems (hints)
- d) Pressure measurements
- e) Quality measurements
- f) Infrared thermography

**2. 4 hours, September 20, 2024, 14:45-18:45**

- g) Flow visualization
- h) Shadography, Schlieren, Interferometry
- i) Phase detection
- j) Optical fibres
- k) Quantification of experimental errors