Short-term Training for technical staff and scientists

Evaluation of mirror solar reflectance versus incidence and acceptance angle

Location: Italy – ENEA-Casaccia (Rome)

Date: June 12-13, 2023

Modality: Face-to-face

Target group: The course is designed for engineers, researchers and representatives from European CSP industry and companies who want to be trained on the latest procedure recommended by SolarPACES reflectance guidelines.

Objective: This course focuses on the equivalent model algorithm successfully used for modelling solar reflectance behaviour versus incidence and acceptance angle. The required input data, measured at near-normal incidence, are:
1) hemispherical spectral reflectance in the solar range
2) experimental values of single-wavelength near-specular reflectance (or conic reflectance) at different acceptance angles.

Trainers: ENEA scientists

The training will includes visits, procedures, standards and best practices theoretical and experimental 'hands-on' experience and cover the following topics:

- Mirrors in CSP and measurement of the concerning reflectance
- Dual beam spectrophotometers and best practice to obtain reliable measurements of hemispherical reflectance spectra
- Review of Standard Solar spectrum; Solar and UV weighting
- Theory of the Equivalent Model for Solar Mirrors
- Review of the proposed instruments for measuring near-specular (conic) reflectance
- Theory and practice on the Solar Mirror Qualification set-up version 2
- Characterization exercises on several commercial mirrors

Agenda

First day

08:30 - 09:15	**Arrival-Registration and delivery of documentation**
09:15 – 09:30	**Training overview and goals**
09:30 – 09:45	**Mirrors in CSP: approaching to the problem of reflectance measurement**
09:45 – 10:30	**Hemispherical reflectance measurement: dual beam commercial spectrophotometers, integrating sphere, reference mirrors, errors, and best practice**
10:30 – 10:45	**- Coffee break -**
10:45 – 12:00	**Near-specular solar reflectance, the two ways to get it: direct measurement or modeling of single-wavelength experimental data. Theory of the equivalent model for solar mirrors.**
12:00 – 13:00	**- Lunch break -**
13:00 – 14:30	**Visit to PCS facility, OMSoP dish, and Perkin Elmer Lambda 950 spectrophotometer**
14:30 – 15:30	**Review of the proposed instruments by the SolarPACES expert group**
15:30 – 16:30	**SolarPACES reflectance guidelines**

Agenda

Second day

09:00 - 09:30	**Open discussion on the first day**
09:30 – 10:30	**Short training on SMQ2 set-up**
10:30 – 10:45	**- Coffee break -**
10:45 – 12:00	**Theory and practice on the processing software SMQexpo**
12:00 – 13:00	**- Lunch break -**
13:00 – 14:00	**Visit to the solar collector optics laboratory – how to measure mirror 3D shape**
14:00 – 15:30	**Hand-on experience with SMQ2 on several commercial products**
15:30 16:30	**Final discussion and feedback on the training**

MEETING PLACE & ACCOMMODATION

Training place	**ENEA-Casaccia**
Address Training Location:	**Via Anquillarese 301, Santa Maria di Galeria (Roma), Italy**
How to get to the Training place from the airport	• **By train (Leonardo Express → MetroA → FL3)** • **By taxi** • **By car for rent**
Restaurant place	**Launch at ENEA canteen; dinner free**
Accommodation	**Next to ENEA-Casaccia or in Rome city**
Contacts for the Training	**Marco Montecchi (ENEA)** **Tel.: +39 06 3048 3587** **E-mail**: marco.montecchi@enea.it
Participation confirmation for the Training	**SFERA III website :** https://sfera3.sollab.eu/events/list/