

OIC 2025 Measurement Challenge

Organizer Team

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General Remarks

The OIC Measurement Challenge is a unique opportunity for the optical coatings community to benchmark and verify their test equipment and their test procedures for almost 20 years now. As always, a special task is given, which should be challenging but at the same time also meaningful. Moreover, the problem should be accessible to a broad range of potential participants with both, standard equipment and specialized tools.

This time, the main goal of the Measurement Challenge (MC) is the sensitive and precise measurement of the optical losses of a high-reflecting (HR) mirror at a wavelength of 1064 nm and an AOI of 0°. This can be done using standard techniques but also using other approaches and combinative techniques – this is completely up to the participants, their capabilities, and their creativity.

Description of the Problem

Samples

The samples will be HR-mirrors at 1064 nm on 1" diameter super polished fused silica substrates (thickness 6 mm).

In addition, HR coatings for 355 nm will be provided upon special request.

Task

- Determine the optical losses of the HR 1064 nm coatings at 1064 nm, near-normal incidence ($< 10^\circ$)
- Optional: Determine the optical losses of HR 355 nm coatings at 355 nm, near-normal incidence

Possible measurement techniques: Spectrophotometry, Laser Ratiometry, Cavity-Ring-Down, Laser induced Deflection, PCI, Calorimetry, Light Scattering, ...

Further optional tasks

- Separate absorption, total scattering and residual transmittance
- Determine the laser induced damage threshold
- Participants are encouraged to extend their measurements and activities according to their capabilities and submit additional information about the coating.

(This additional information may also be useful to solve the main task)

Sample logistics

The samples will be sponsored by one or more industrial suppliers (in progress) and distributed by Fraunhofer IOF, Jena, upon request of the Measurement Challenge participants.

Note

The samples shall remain with the participants and not be sent back to the organizers.

Requests for samples:

Request via E-mail to:

thomas.gischkat@iof.fraunhofer.de

Subject: "OIC 2025 Measurement Challenge"

Deadline of request for samples: 15 November 2024

The samples will be delivered to the MC participants in December 2024.

Submission of Results

Participants should send their results by E-mail to:

christian.muehlig@iof.fraunhofer.de

Subject: "OIC 2025 Measurement Challenge results"

Deadline for submission of results: 14 February 2025

Format of results:

E-mail containing the participant's name and affiliation as well as:

1. Attached file (MS Word) with:
Short document with brief description of measurement procedures and evaluation methods
2. Summary of results including statement regarding uncertainty of measurement (preferred data format: tabulated ASCII data or Excel sheets)
3. Supplementary results

Participants are encouraged to be generous in also delivering information on the types of equipment they have used as well as to provide any additional comments.

Evaluation Procedure of the Submitted Results

The results of the MC will be evaluated according to the regulations established in round robin experiments:

The submitted data will be evaluated according to the relative deviations of the results of the different labs from each other. The MC results will be presented at the OIC 2025 meeting in an anonymous manner. The list of participants is presented, but the sample number (laboratory number) related to the results does not reveal the respective participant. Each participant recognizes only him-/herself by the given number.