

A large, abstract graphic on the left side of the slide, composed of several overlapping blue circular and semi-circular shapes in various shades of blue.

TC for Metrology in Length: EURAMET project #1239 Measurement of surface roughness by AFM

Coordinators:

Ludger Koenders (until 2019), Uwe Brand (until 2025) – retired
Thorsten Dziomba and Gaoliang Dai

PTB, WG 5.14

Presenter: H. Bosse, TC-L Contact Person, PTB, Germany

19th TC-L Hybrid Meeting

**GUM, Kielce, Poland
13-14 October 2025**



Length

EURAMET Project No 1239

Measurement of surface roughness by AFM



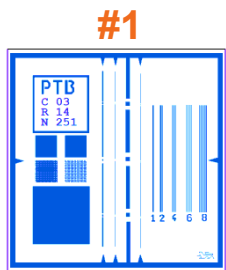
Coordinators:

Ludger Koenders (retired), Uwe Brand (retired), **Thorsten Dziomba**, **Gaoliang Dai**

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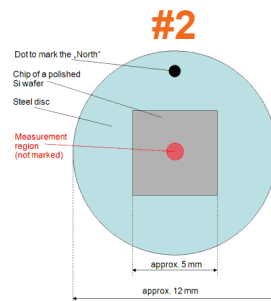
Instruments: Only atomic force microscopes (AFM)

Samples:

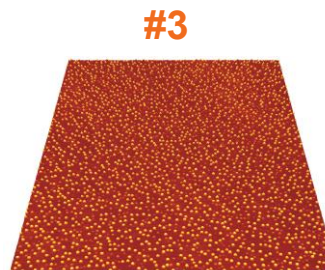


nom. 1000 nm

step height standard



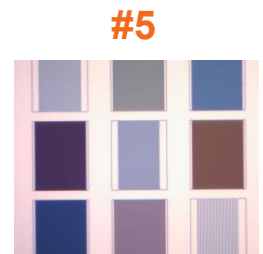
polished Si wafer



Ge-Si nanodot samples



**Simetrics RnS
Lapped Si chip**



**Simetrics RS-N
resolution standard**

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Status as of
2025-09-24

- Originally agreed and scheduled for 2014/2015, but several participants requested postponement back then
- Relaunched in June 2018, with reduced measurement effort and tight conditions
- **Relaunch successful, 2018/2019 without major delays, no change in circulation:**
9 European NMIs have measured within the agreed timeslots,
1 NMI had to withdraw from measurements (lack of time)
- **control measurement at PTB in late 2019:**
 - polished Si chip got heavily contaminated during circulation, demanding analysis
 - but all other samples still quite clean + stable so that results can be compared well
- NIST measurements were planned, but had to be postponed repeatedly due to pandemic, finally cancelled due to aging/contamination of samples
- **Analysis: Two-fold in parallel to identify possible bias by operator**
 - 1) **central analysis by pilot lab** – all participating European NMIs have submitted – finished 2023
 - 2) **analysis by participants** – all reports submitted, analysis/plots compiled in spring/summer 2023
- **Draft A.1** circulated to participating NMIs in Sep. 2024 => minor corrections/additions
Draft A.2 circulated to participating NMIs in Jan. 2025 => editorial remarks only
- **Final report based on Draft A.2 plus detailed introduction, context & discussion** is being finalized, awaiting approval by EURAMET TC-L,
planned publication: in full, open-access PTB repository
possible further action: excerpt of most important results & discussion in **a journal paper**
furthermore: input to ISO/TC 201/SC 9 and other guideline/standards committees....

