Applications of SSI

Case Study – High Precision Sphere Measurements

Presented By:

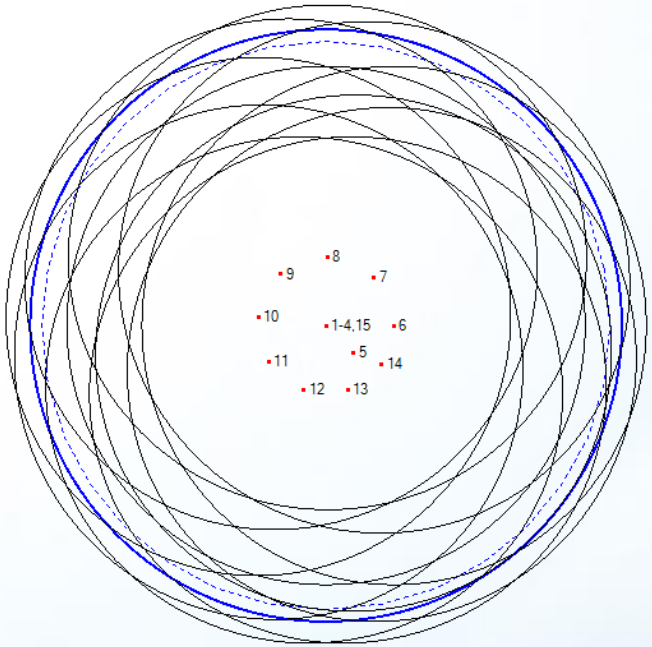
QED Technologies Applications and Engineering

High-precision sphere measurements

Small, fast sphere (Zygo reference sphere)

Surface

Name	Part a
Aperture Shape	Circle
Clear Aperture	36.000 mm
Profile	Sphere
Vertex Shape	Concave
Radius	-25 mm



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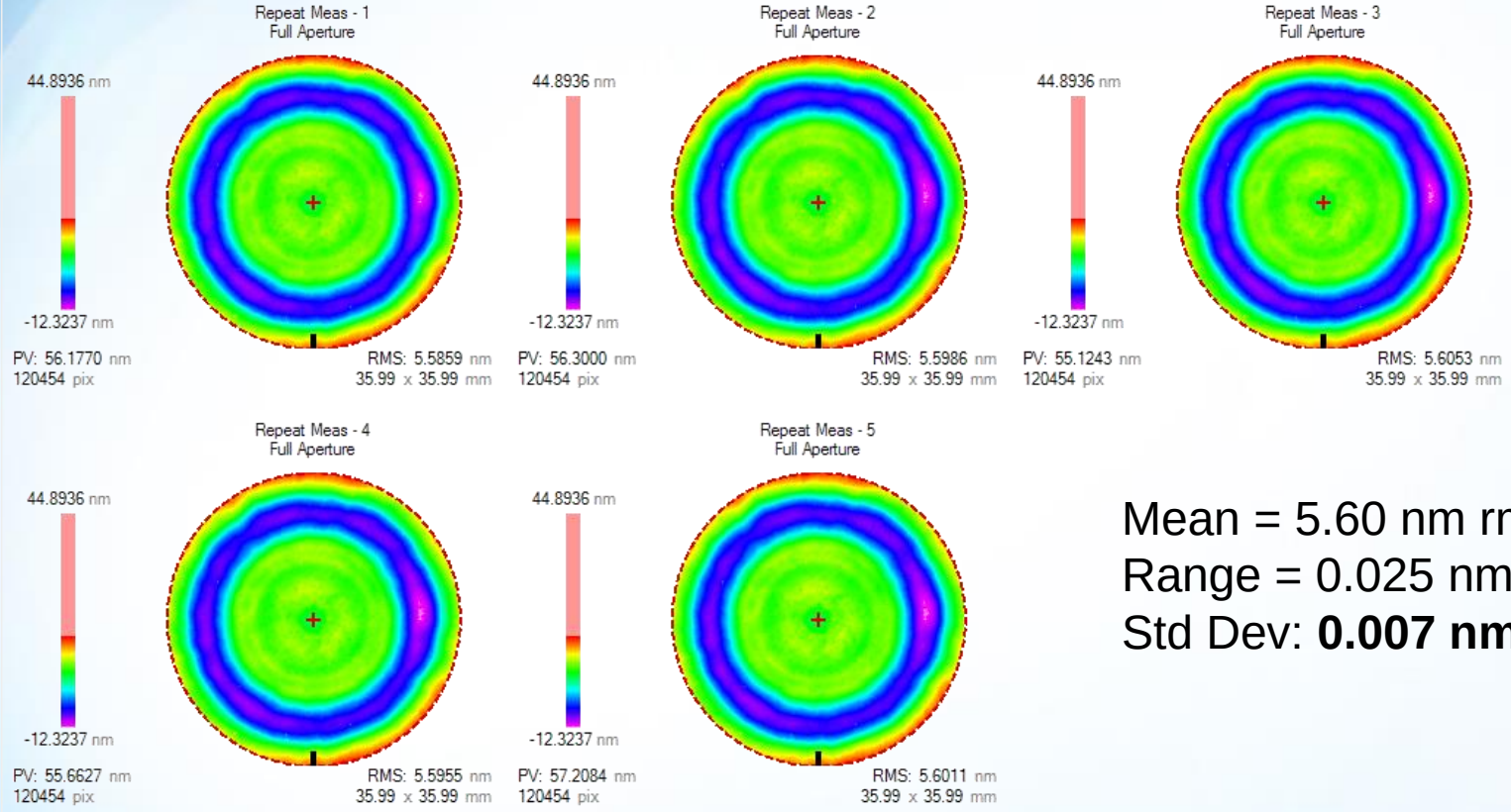
High-precision sphere measurements

Repeatability results



Mean = 5.60 nm rms
Range = 0.025 nm
Std Dev: **0.007 nm rms**

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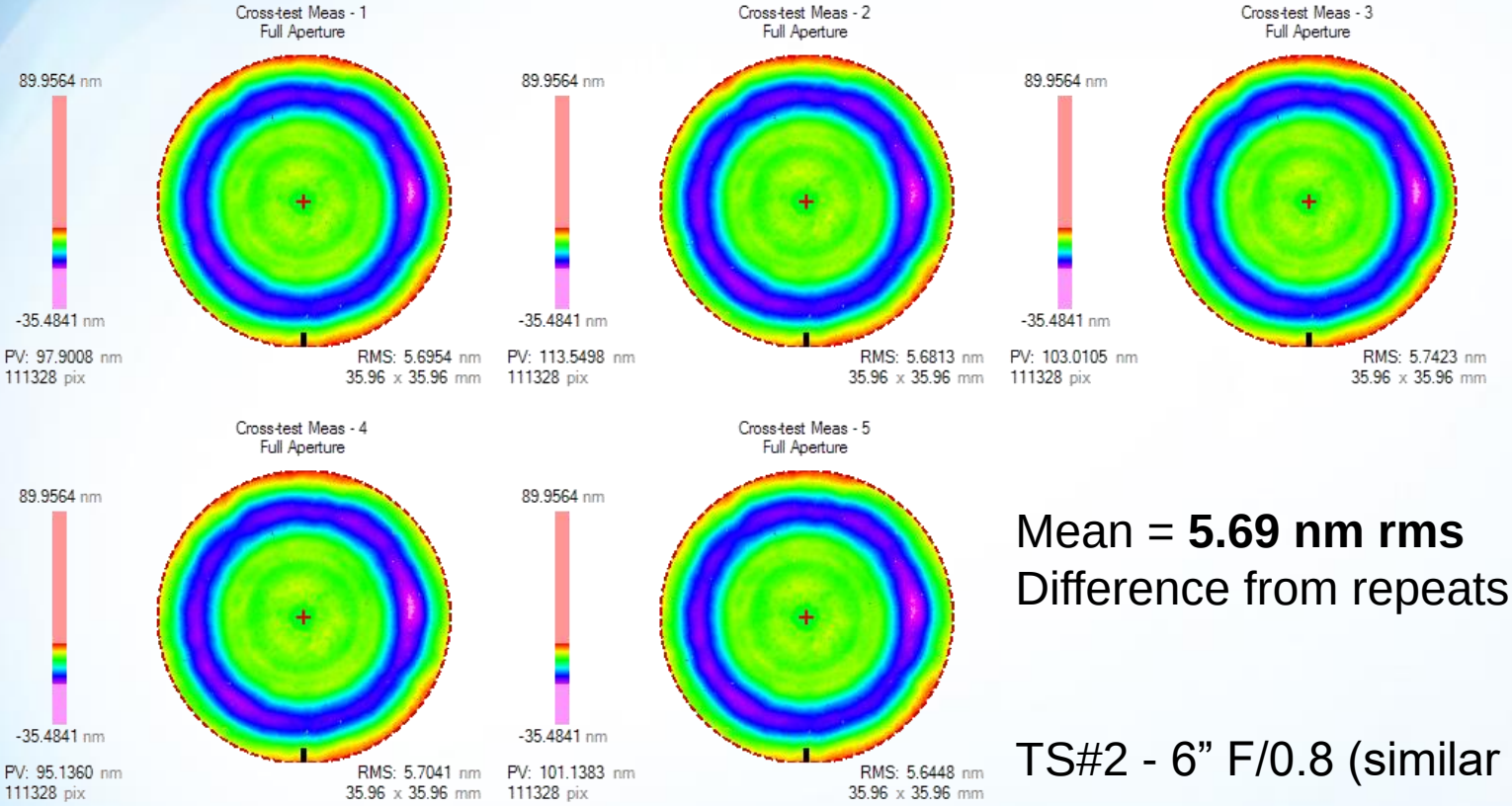
High-precision sphere measurements
Cross-test results



Mean = **5.69 nm rms**
Difference from repeats = **0.09 nm**

TS#2 - 6” F/0.8 (similar lattice)

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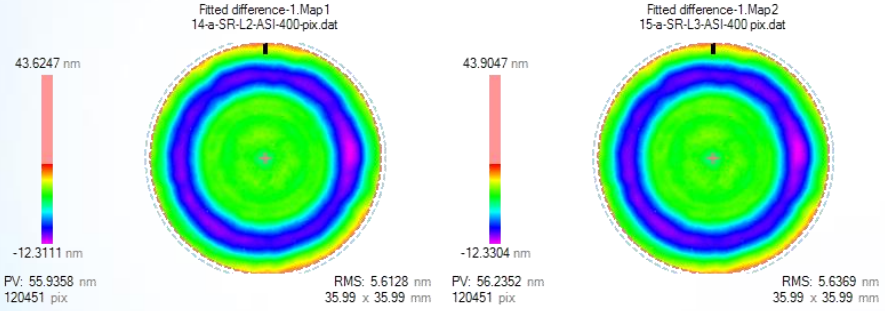
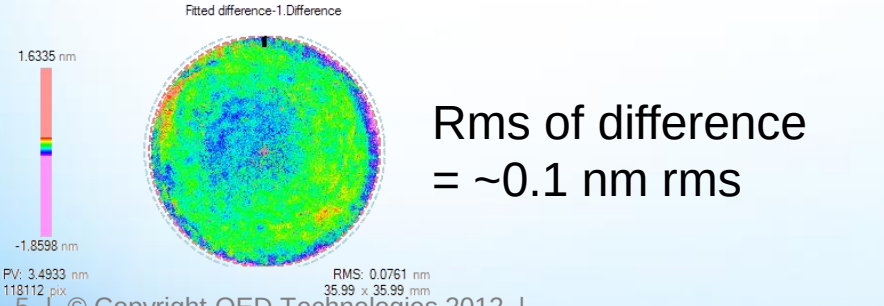
High-precision sphere measurements
Pixel-by-pixel subtractions

- Performed pixel-by-pixel subtraction on average of 10 measurements
  - Slightly different lattice (different level of overlap) used for the two sets of 10 measurements
- Pixel-by-pixel comparisons will give higher results than comparing rms numbers, so sub-nm results are excellent
  - ***Difference is at noise level of Zygo interferometer***

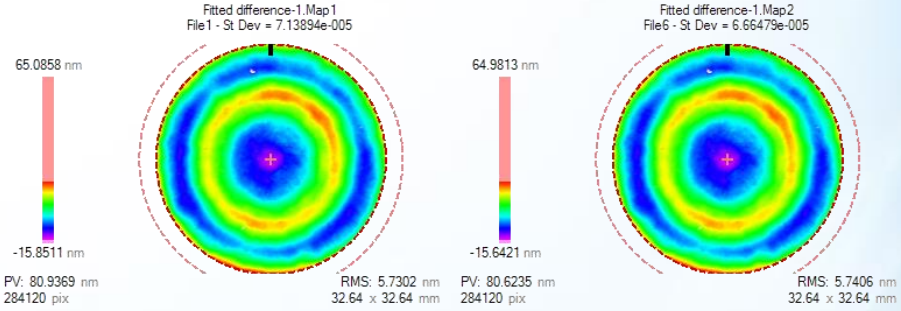
Comparison of average of stitched measurements

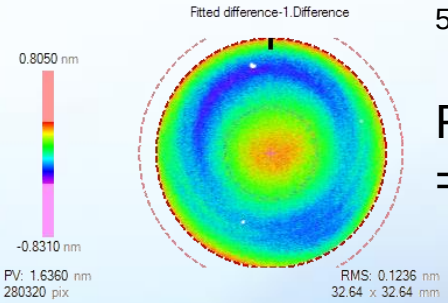




Rms of difference
= ~0.1 nm rms

Comparison of average of single measurements





5 repeat vs 5 repeat

Rms of difference
= ~0.1 nm rms

