

Advanced Photon Source

Experimental Facilities Division,

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Report on Optical Substrate Measurements

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Component: Flat KB mirror	Requester: E. Dufresne	Date in/out: May 16, 05/May 17, 05
Manufacturer:	Affiliation: MHATT-CAT	
	Beamline: 07-ID	
Lab coordinator: L. Assoufid	Measurement by: J. Qian	Report by: J. Qian

Description of the measured component:

Flat KB mirror:

Size: 23.8 – 46 mm x 200 mm x 7 mm

Coating: No

Performed measurements:

Surface roughness (Determine which side of the KB mirror is super-polished)

Surface slope (Measure the super-polished surface only)

Instruments used for measuring:

An "X" indicates the instrument(s) used.

Surface roughness:

WYKO-TOPO-2D, 1.5x 5x 40x

WYKO-TOPO-3D, 1.5x 5x 40x

Surface figure:

WYKO-6000

Surface slope:

LTP

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Surface roughness measurement with the TOPO2D, objective 5X

- The separation of adjacent measured spots was about 10 mm.
- Table 1 summarizes the roughness measurement results of the mirror.

Table 1. Results of the roughness measurements. (Profile length: 2.66 mm)

Surface	Meas. (#)	RMS (A°)	P-V (A°)	Radius (km)
Super-polished (marked with an arrow on side of the mirror)	1	1.06	6.3	-1.0
	2	0.80	4.7	-0.8
	3	0.71	4.3	-1.0
	4	0.93	5.0	-0.9
	5	0.84	4.9	-1.0
	Mean	0.87	5.0	
The other side	1	9.2	51.3	-0.9
	2	8.2	38.9	-2.2
	Mean	8.7	45.1	

Surface slope profile measurement with the LTP

- The mirror was set face-up and scanned over a length of central 172 mm (see Figure 1).
- Table 2 summarizes the results of the LTP measurements. Residual slope data were obtained by removing the best-fit cylinder from the LTP raw profiles.
- Figure 2 shows the residual slope and height profiles.

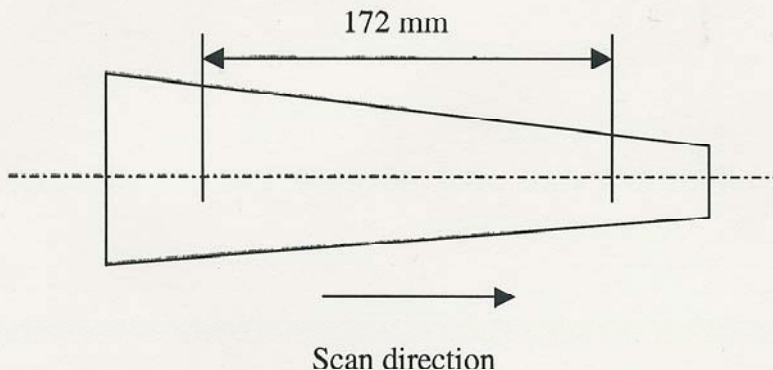


Figure 1. LTP scan direction.

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Table 2. Results of the surface slope measurements.

Residual slope		Residual height		Radius (km)	Figure (#)
RMS (μrad)	P-V (μrad)	RMS (μm)	P-V (μm)		
0.85	3.77	0.03	0.05	7.7	2

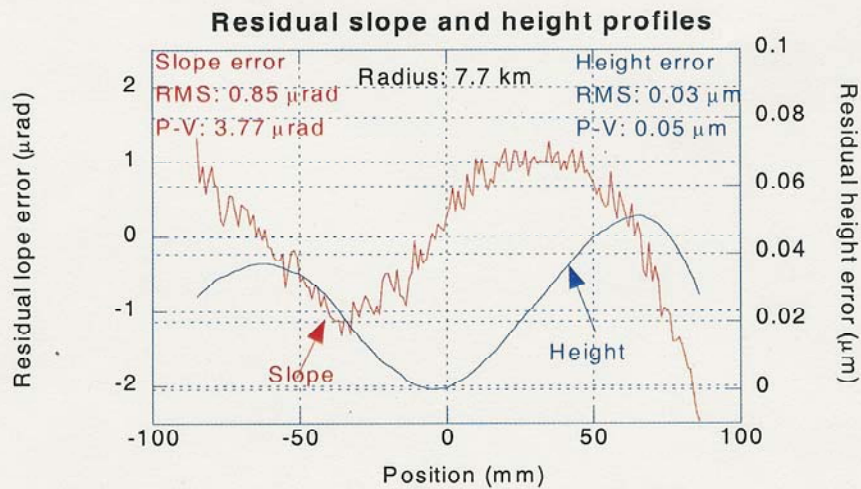


Figure 2. Residual slope profile (red curve) and the corresponding residual height (blue curve). The mirror shows a radius of curvature of 7.7 km.