

NEW Mirror Stability Studies

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Setup

Mirrors

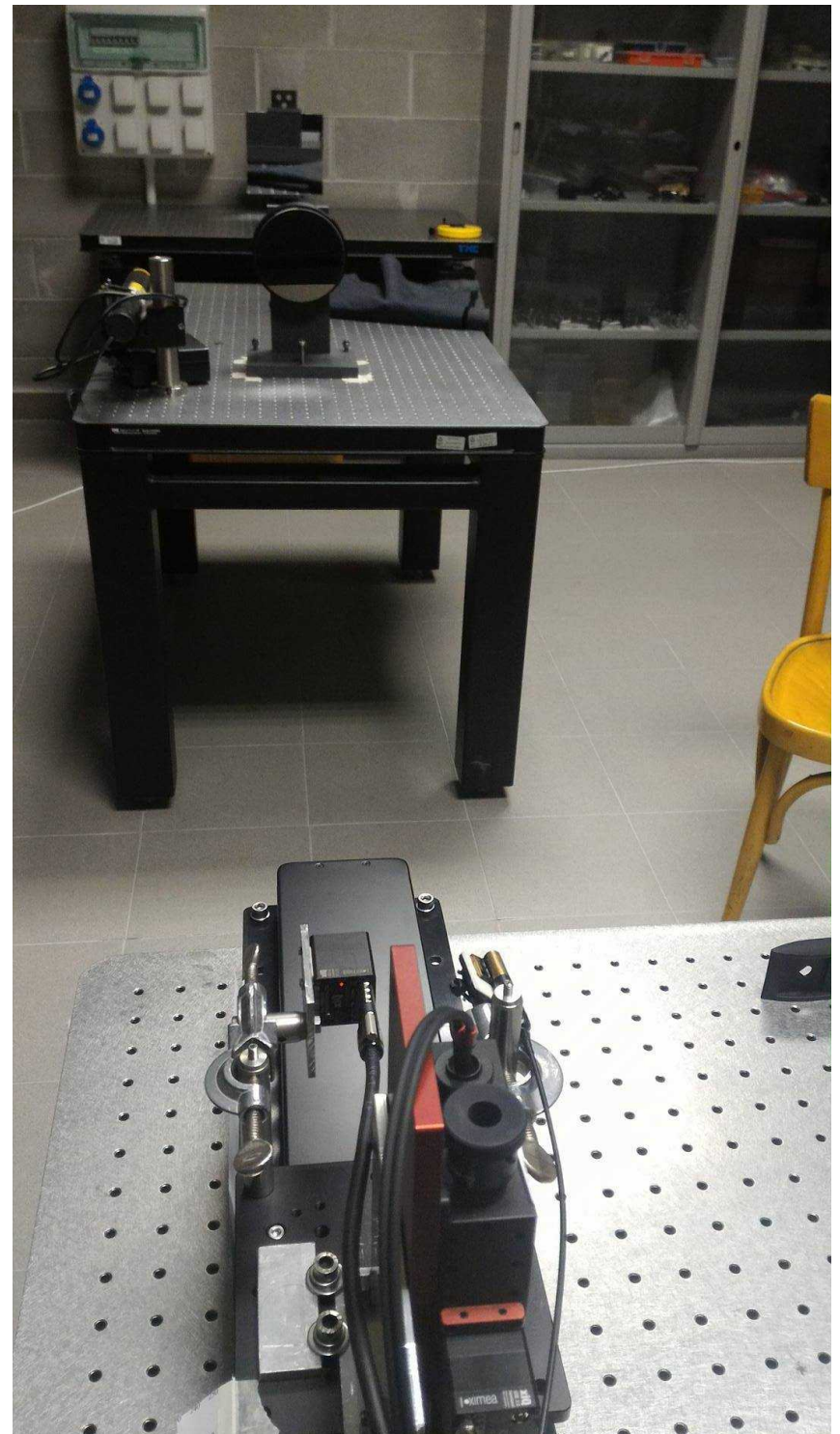
CMA2

Edmund
Mirror

Sensors

D0 Sensor

Optino Sensor

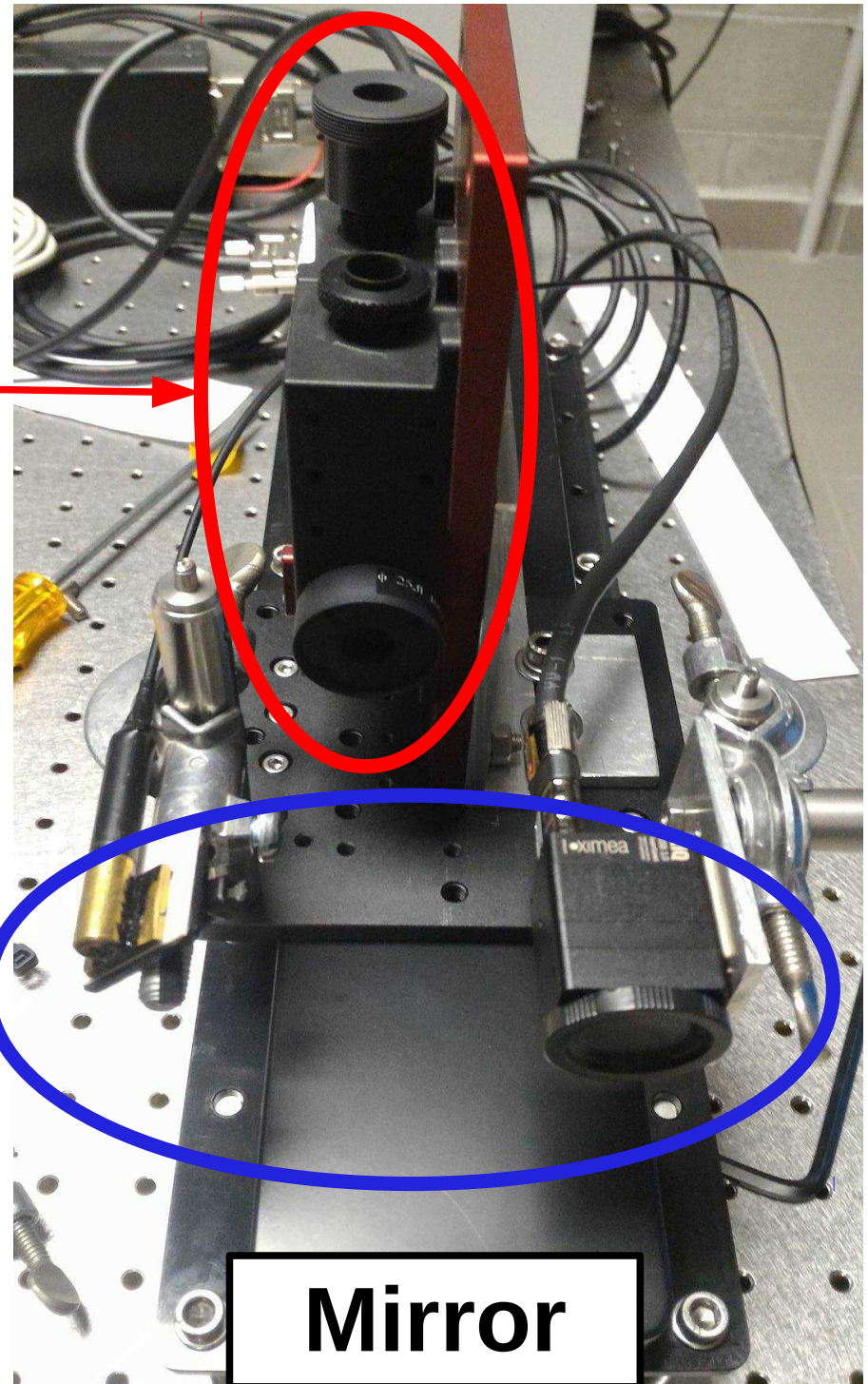


Sensors

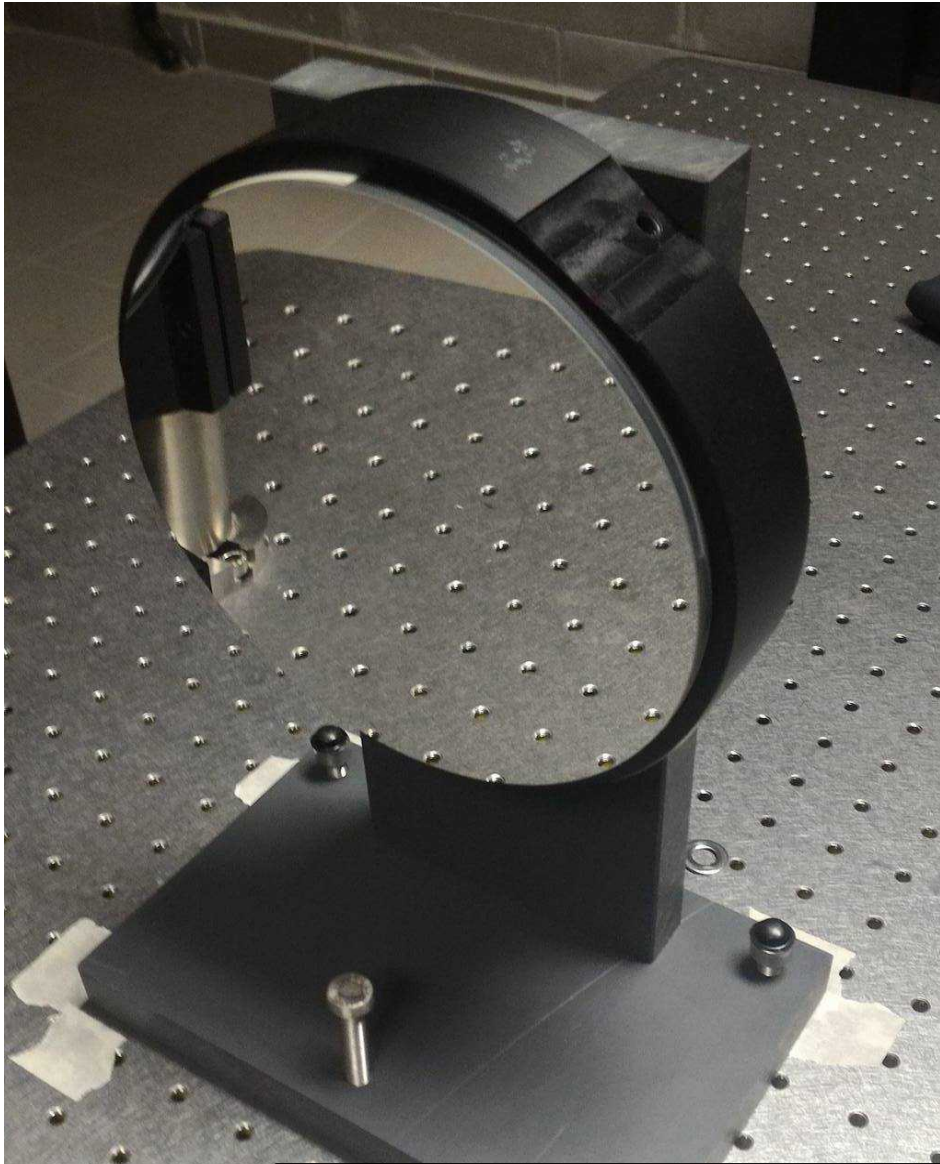
Optino
Sensor

D0
Sensor

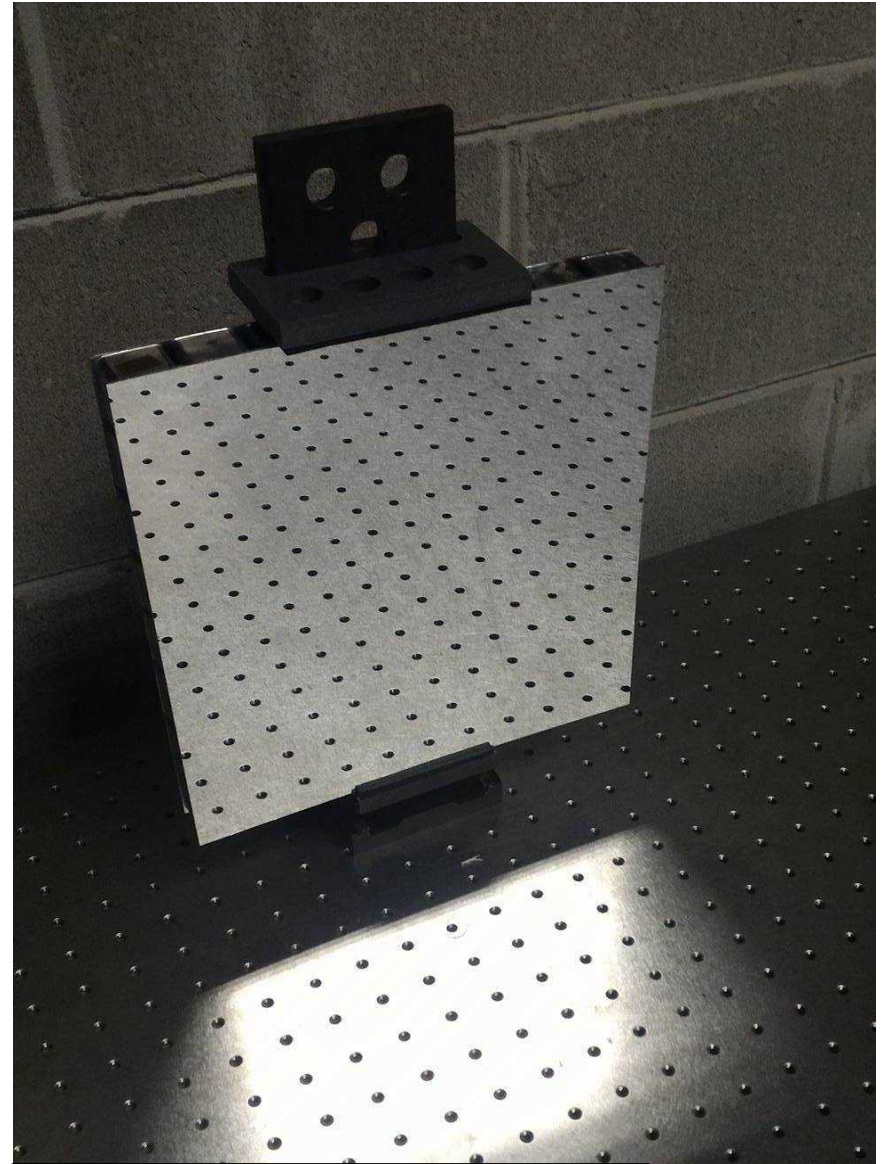
Mirror



Mirrors

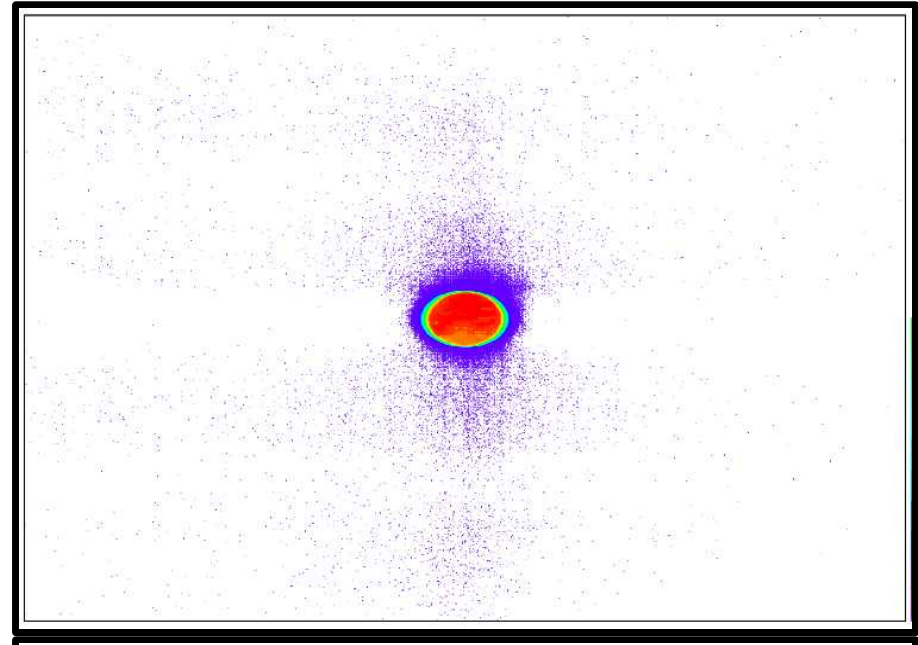
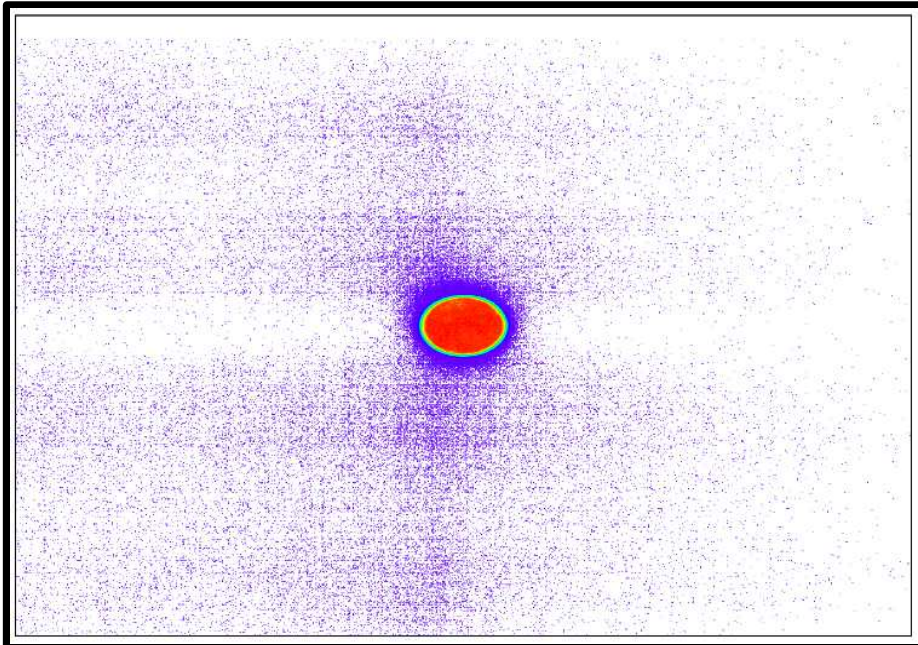


Edmund Mirror
- coated -

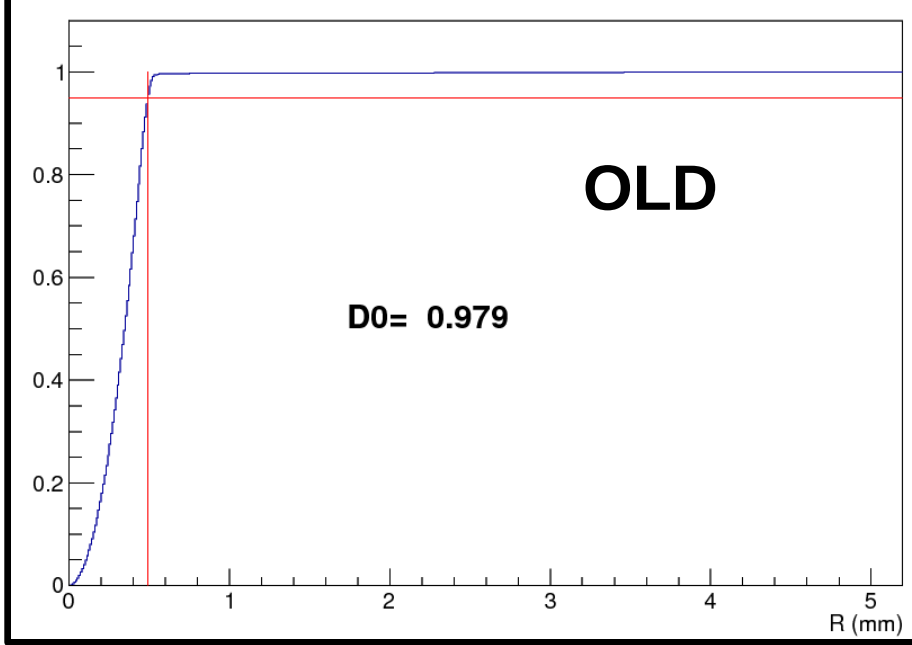


CMA2 Mirror
- coated -

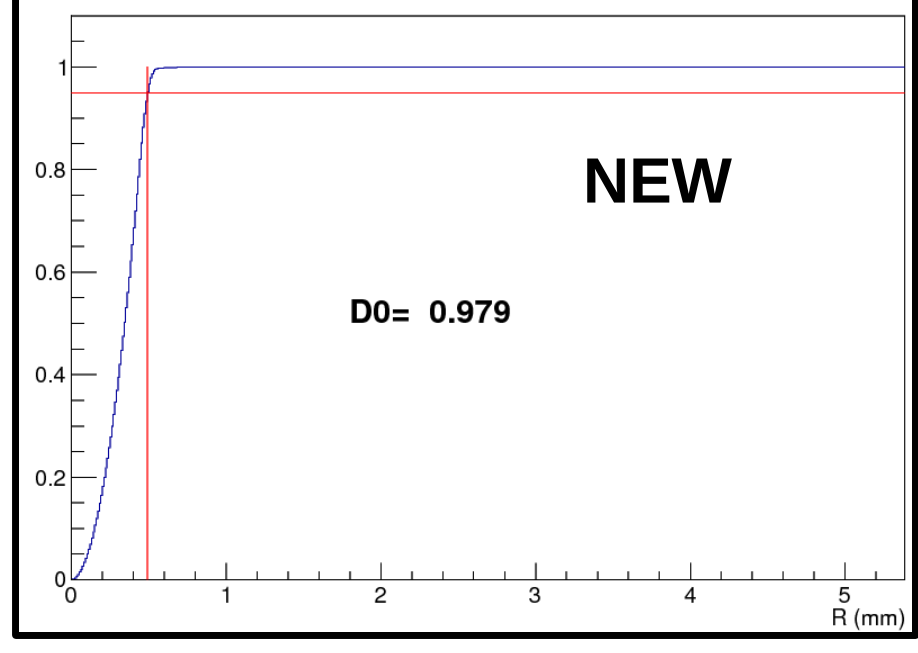
D0 Analysis Edmund Mirror



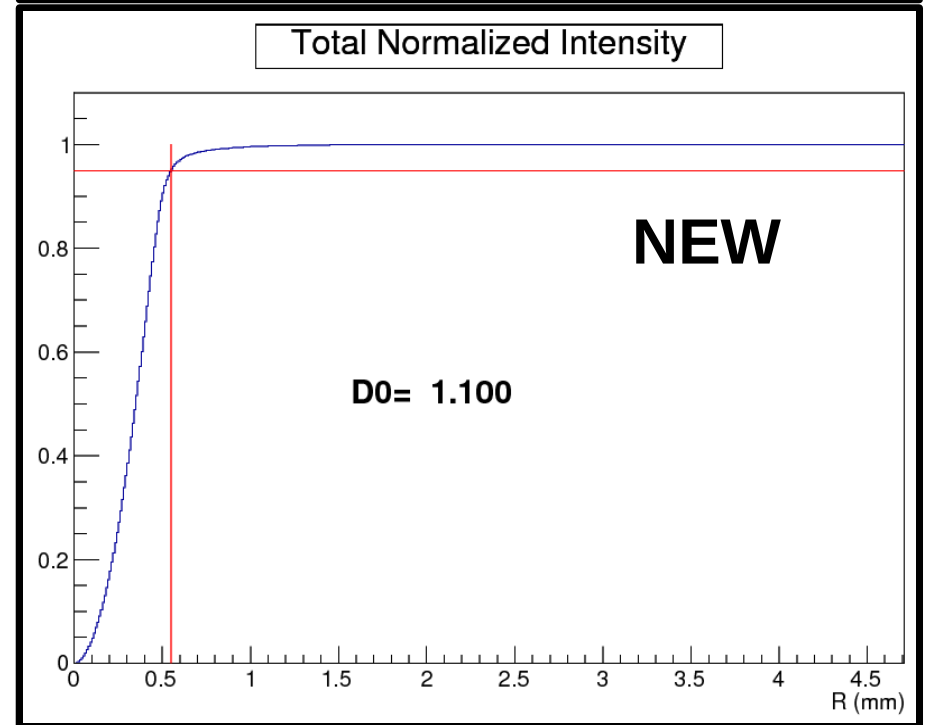
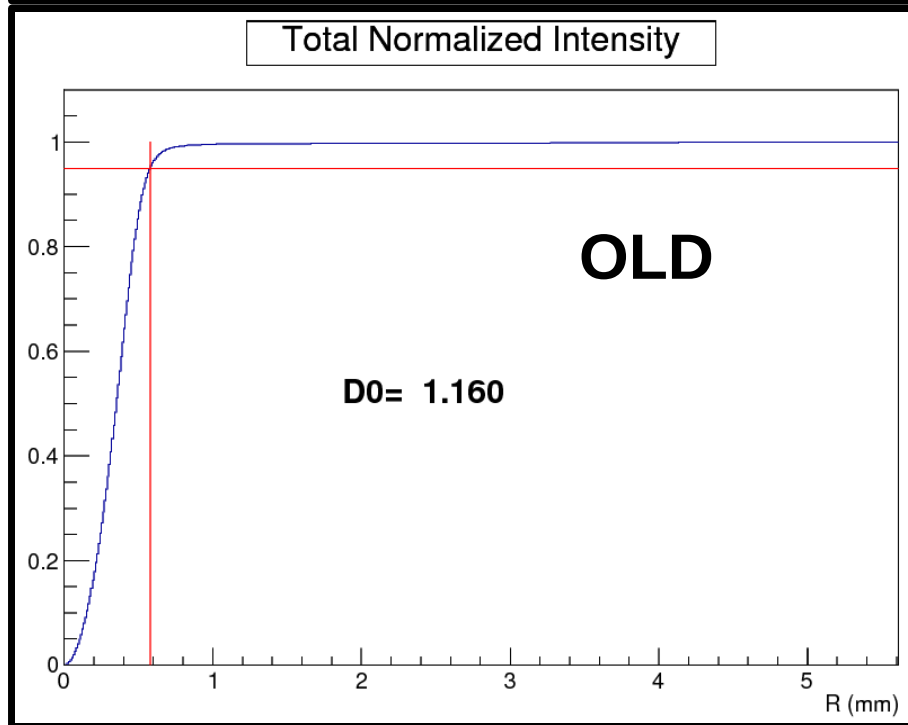
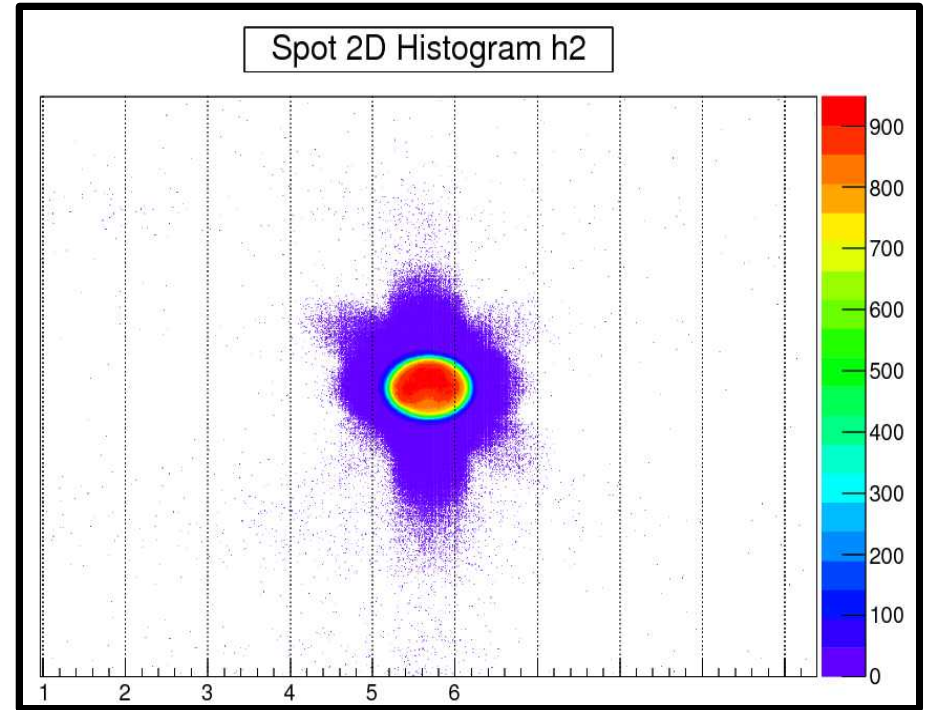
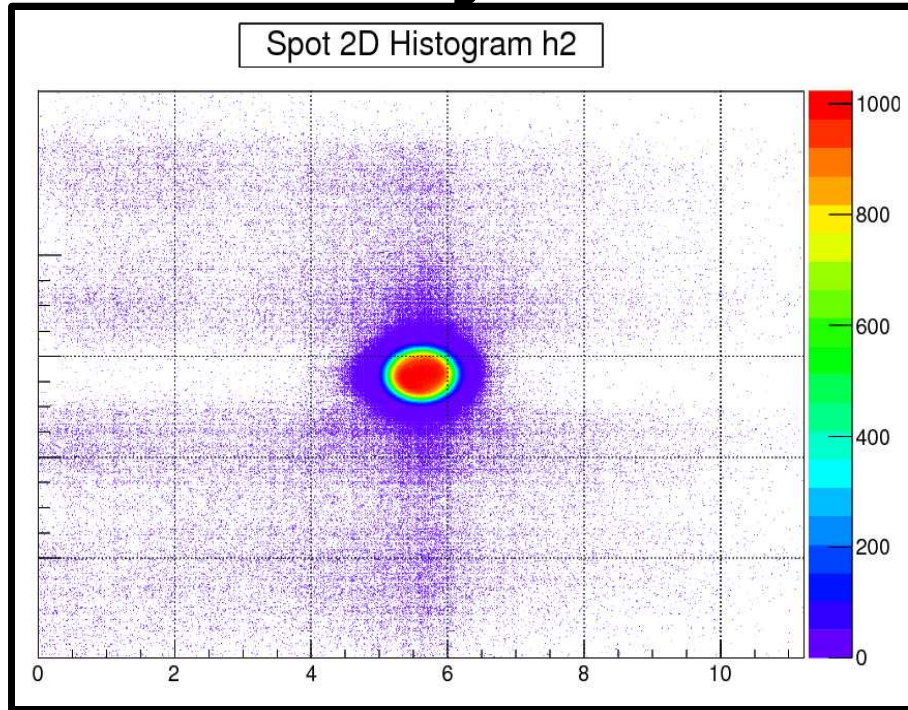
Total Normalized Intensity



Total Normalized Intensity



D0 Analysis CMA2 Mirror

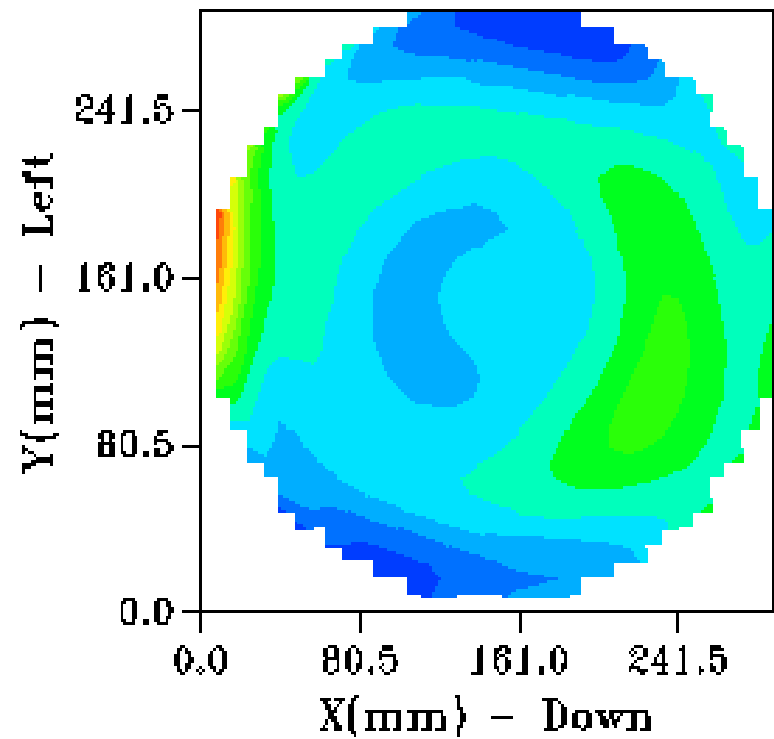
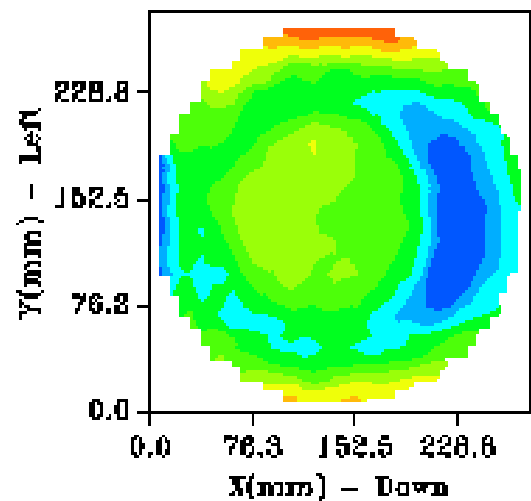


Shack Hartmann - Optino Analysis

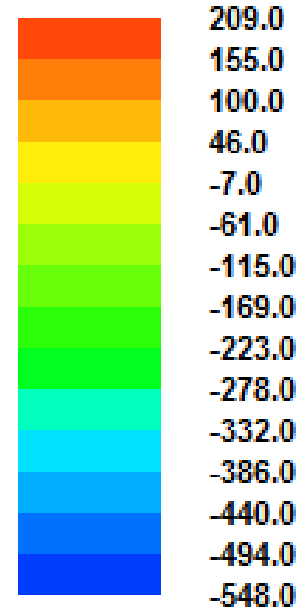
Parameters:
 SH - Defocus
 SH - RMS
 SH - PV

P-V=420.0, rms=83.4nm

surface - Tilt, Defocus su
 Contour of Modal wavefront



P-V=190.1, rms=91.0nm



Defoc -208.0

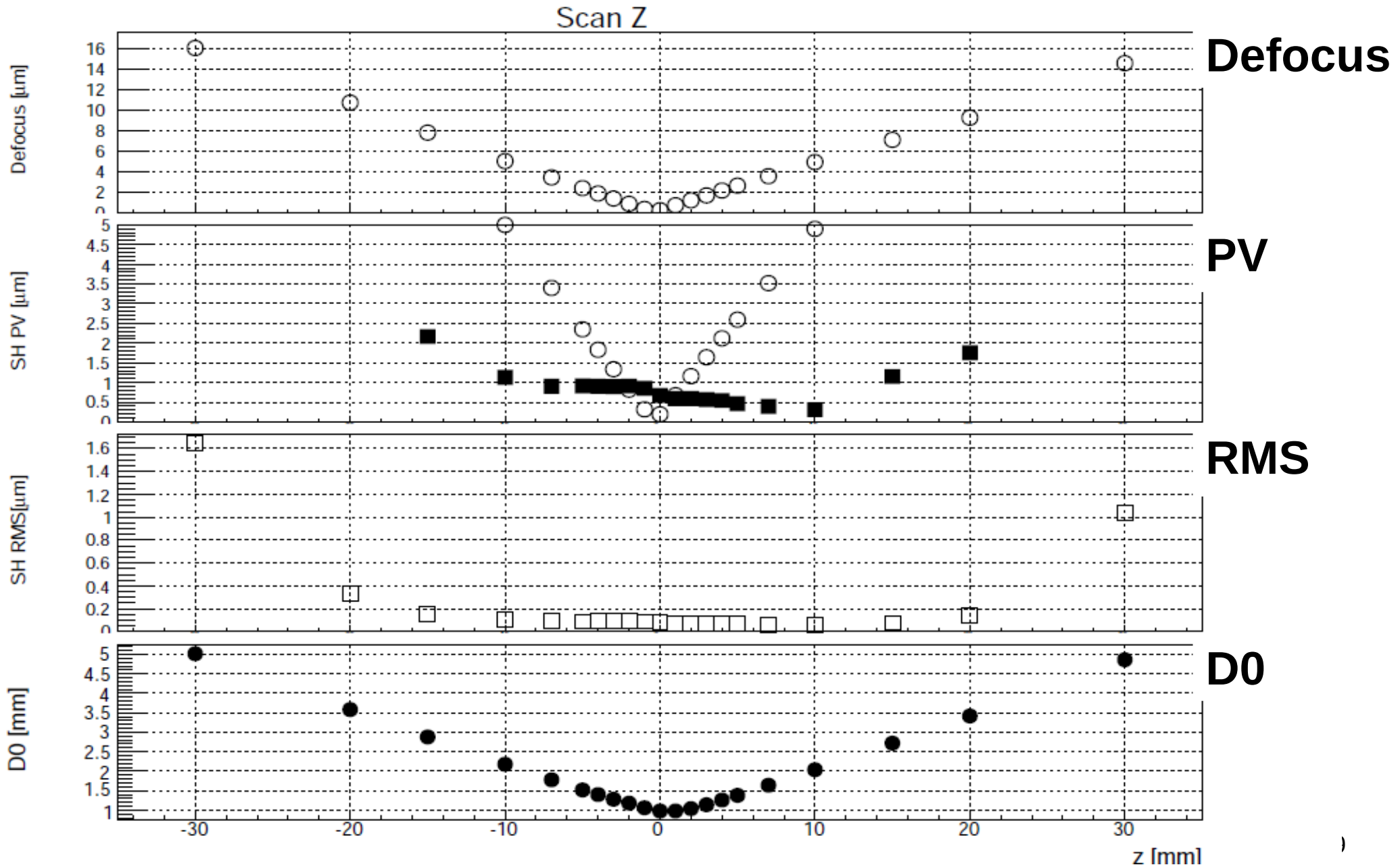
SH-z_7 // - Analyzed: 05/02/2016 - No. of spots 1129 (38x41)
 Company/User: INFN - Ferrara - - Instr: SpotOptics OptinoSensoft
 Surface - SP. fl=3500mm, d=289.8mm, Coll: fl=100mm. Lenslet: (7mm, 0.2mm)

Defoc	-208.0	Tilt	6267.0,134.4	Ast3	124.1,-13.2	TComa	42.6, 48.7	QAst	16.0, -6.6	Foil5	29.4, 34.7
SA3	-17.7	Coma	60.7,169.1	Ast5	37.2,-11.6	TCom5	23.4, 45.2	QAst5	18.8, -7.3	Foil6	17.0, -9.6
SA5	48.3	Com5	18.0,129.7	Ast7	15.4,-43.8	TCom7	7.6, 30.9	QAst7	4.3,-22.4	Foil7	10.9, 19.6
SA7	21.4	Com7	12.0, 80.3	Ast9	13.0,-60.9	TCom9	7.9, 14.7	QAst9	4.8,-33.5	Foil8	18.1, -3.1
SA9	-15.0	Com9	6.1,114.3	Ast11	10.0,-61.8	TCom11	4.3, 23.4	QAst11	2.0, -36.0		

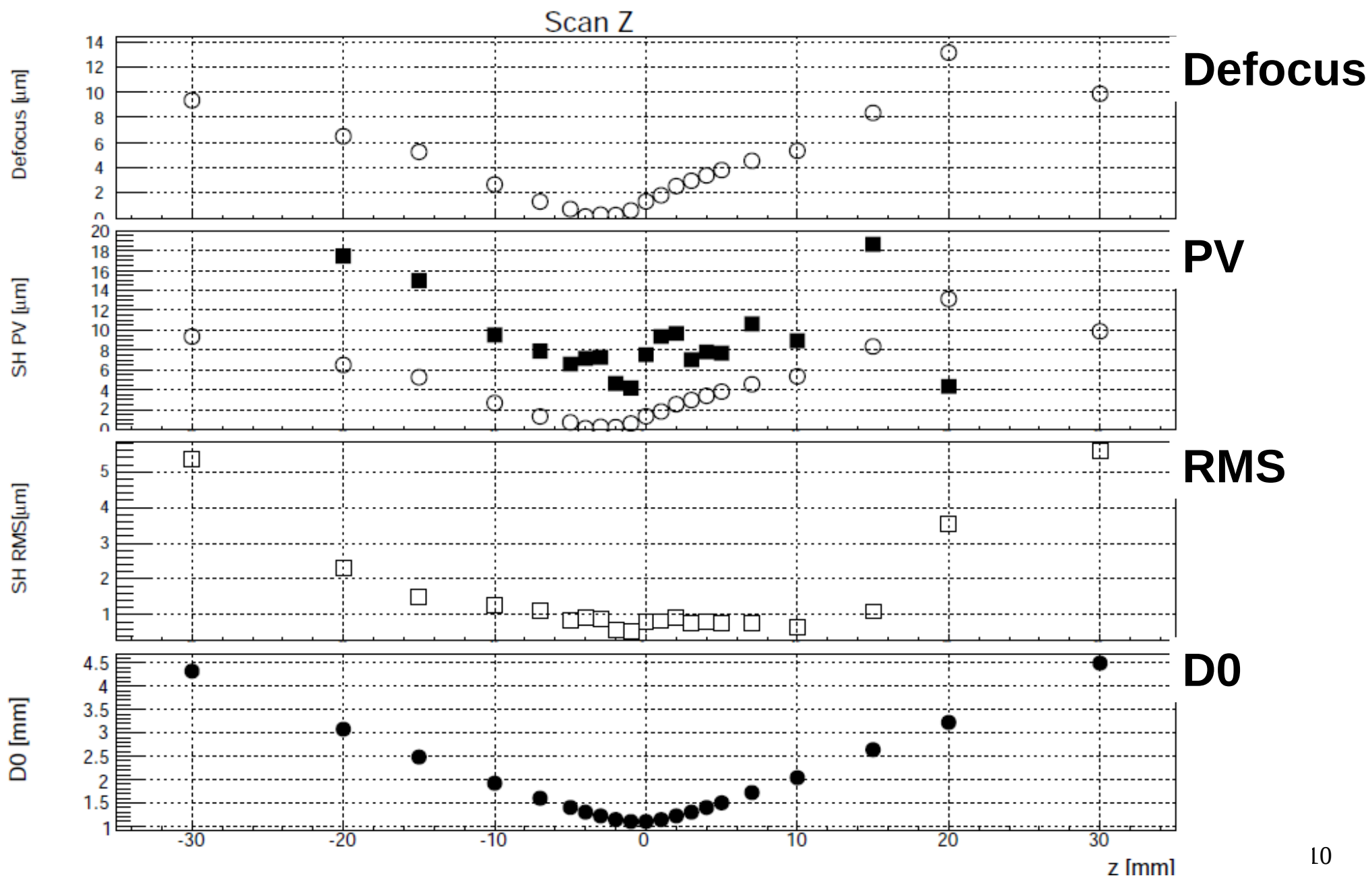
Z Scan

Edmund Mirror
CMA2 Mirror

Z Scan – Edmund Mirror



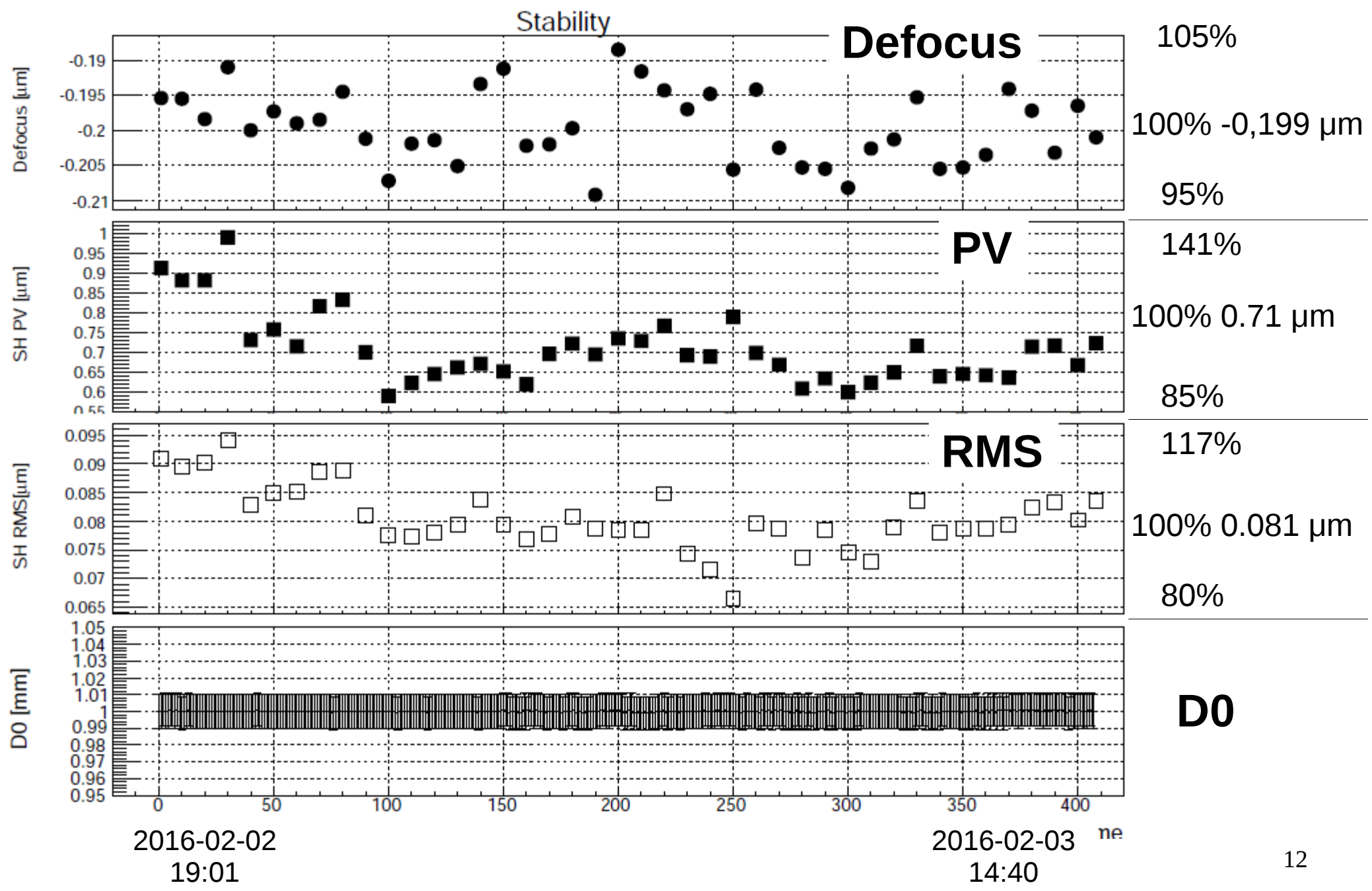
Z Scan – CMA2 Mirror



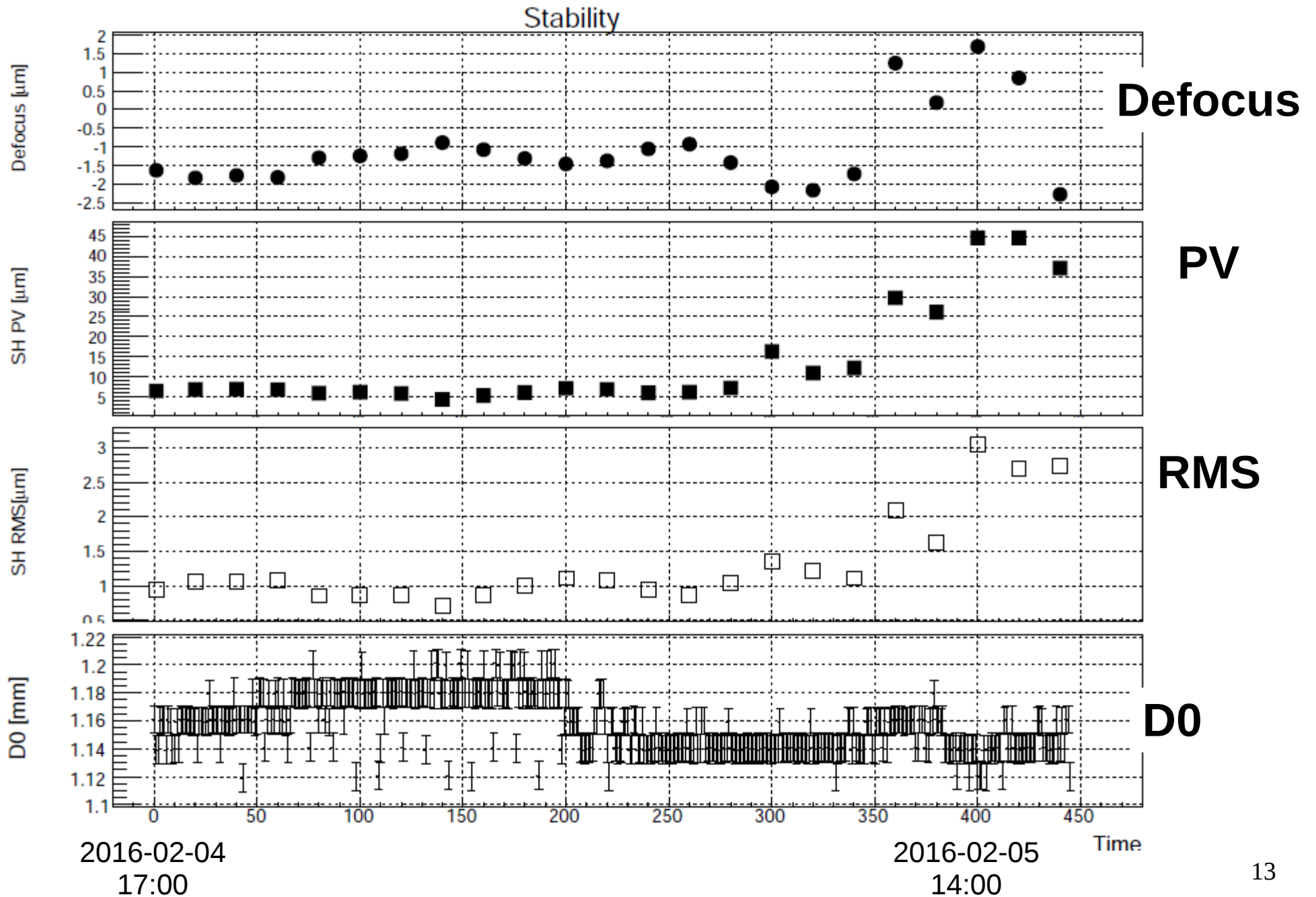
Stability Scan

Edmund Mirror
CMA2 Mirror

Stability – Edmund Mirror

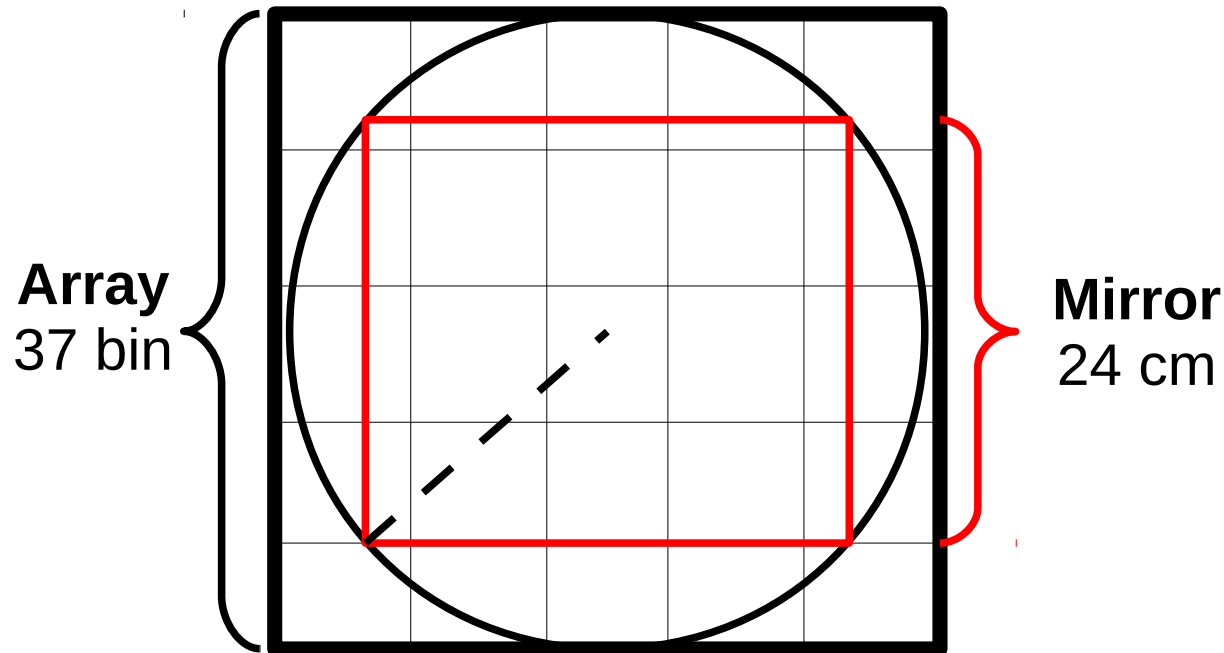
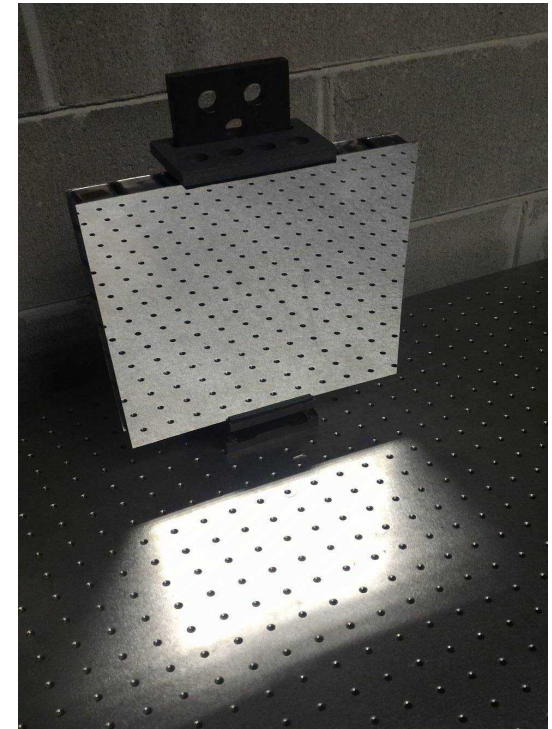
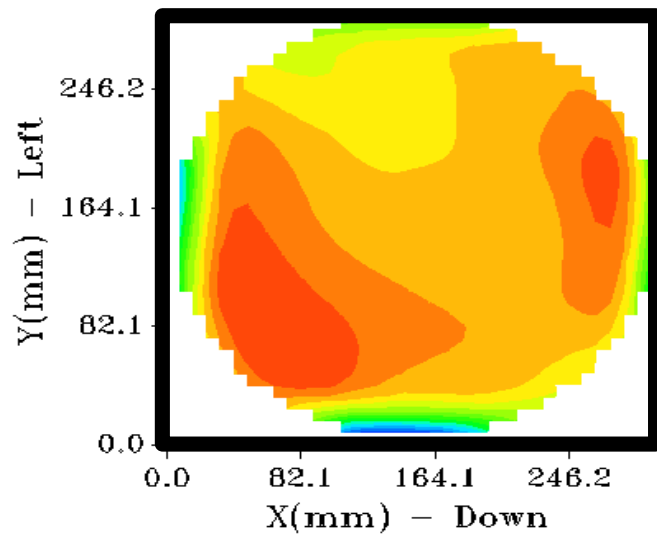


Stability – CMA2 Mirror

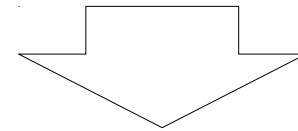


Shack Hartmann – D0

CMA2 Mirror



STEP ANALYSIS

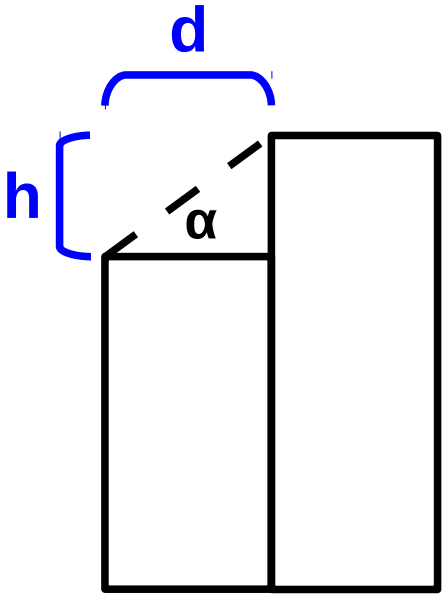


$$d = \sqrt{(2)} \cdot \frac{\text{Mirror}}{\text{Array}}$$

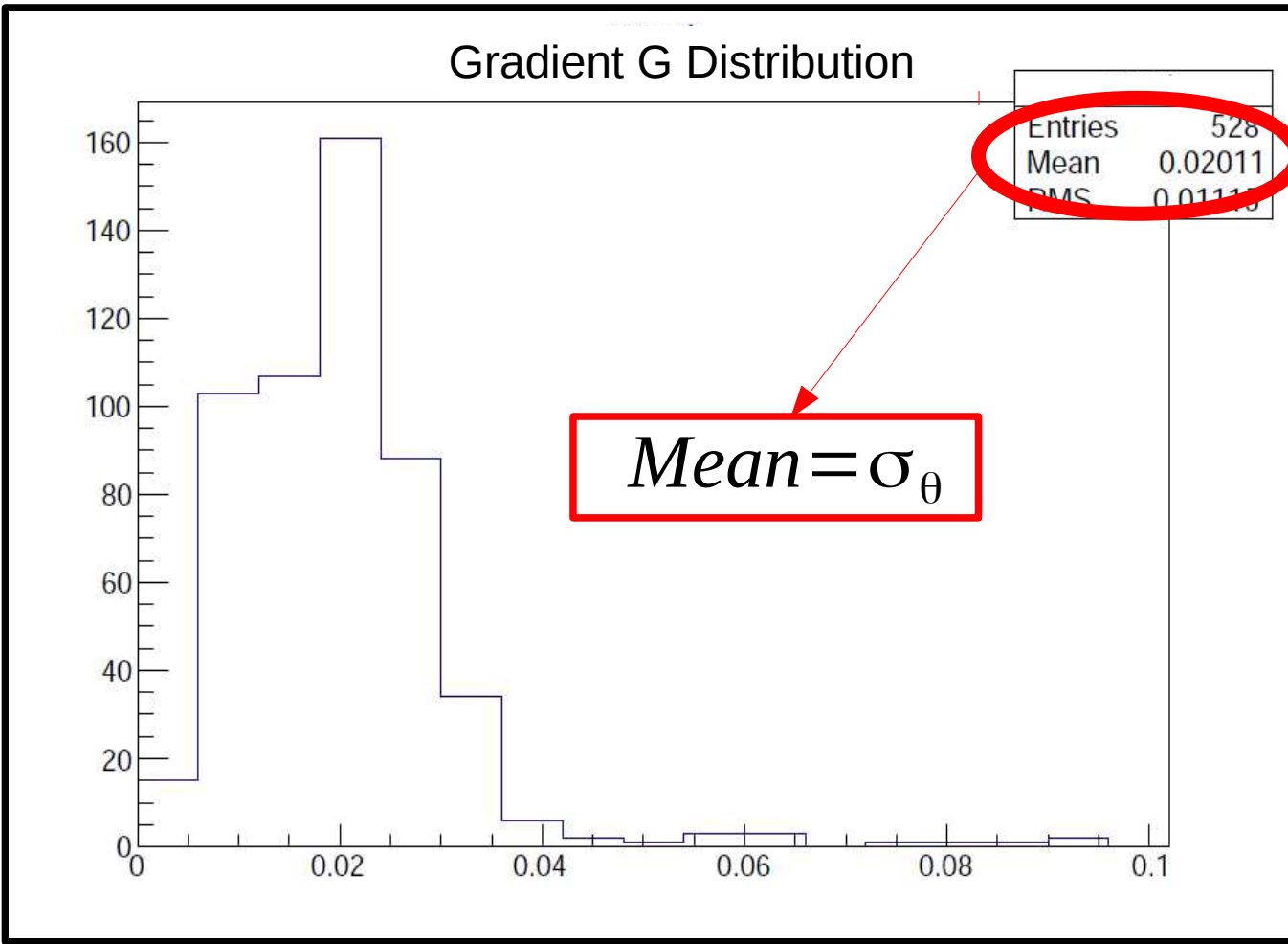
Shack Hartmann – D0 CMA2 Mirror

1 $\left\{ \begin{aligned} gr_x &= \left(tg^{-1} \left(\frac{h}{d} \right) \right) \\ gr_y &= \left(tg^{-1} \left(\frac{h}{d} \right) \right) \end{aligned} \right.$

2 $G = \sqrt{(gr_x^2 + gr_y^2)}$



X: (i,j) (i+1,j)
 Y: (i,j) (i,j+1)



Shack Hartmann – D0

CMA2 Mirror

3 $D0^{pure} = 4 \cdot 2R \cdot \sigma_{\theta} = 0,64 \text{ mm}$

$R = 4 \text{ m}$
 $S = 0.96 \text{ mm}$

4 $D0^{measured} = \sqrt{((D0^{pure})^2 + S^2)} = 1,15 \text{ mm}$

$$D0^{D0 \text{ analysis}} \simeq D0^{measured SH}$$
$$(1,10 \pm 0,01) \text{ mm} \simeq 1,15 \text{ mm}$$

