

SMS Reflectometer measurements before and after CO2 cleaning of WHT Primary mirror
 24 February 2014. Cleaning performed by Neil and Emilie. Report by Neil.
 Measurements usually performed in pairs to check 0.05% repeatability.

Lambda	0.67 micron	
Incident Angle	25 deg	<--SMS Summary characteristics
BW Limits	1 0.01	

datum #	Scattering at angles Θ, Φ			Reflectivity	user comment	Roughness RMS(Å)	TIME	DATE
	$\Theta_s \rightarrow$	0	50					
1	M1 loc 1	8.28E-03	3.98E-03	0.826		67.3	"10:48:57"	"02-24-1914"
2		8.24E-03	3.98E-03	0.823		67.3	"10:49:02"	"02-24-1914"
3	2	7.89E-03	3.88E-03	0.838		65.1	"10:49:12"	"02-24-1914"
4		7.89E-03	3.88E-03	0.838		65.1	"10:49:17"	"02-24-1914"
5	3	1.10E-02	4.33E-03	0.825		78.7	"10:49:33"	"02-24-1914"
6		1.10E-02	4.33E-03	0.825		78.7	"10:49:38"	"02-24-1914"
7	4	7.98E-03	3.05E-03	0.832		67	"10:49:53"	"02-24-1914"
8		8.02E-03	3.05E-03	0.831		67.3	"10:50:00"	"02-24-1914"
9	5	8.60E-03	3.93E-03	0.822		69	"10:50:10"	"02-24-1914"
10		8.58E-03	3.94E-03	0.823		68.8	"10:50:16"	"02-24-1914"
11	6	8.08E-03	3.37E-03	0.831		66.9	"10:50:26"	"02-24-1914"
12		8.07E-03	3.36E-03	0.831		66.9	"10:50:31"	"02-24-1914"
13	7	6.98E-03	2.31E-03	0.843		63.3	"10:50:58"	"02-24-1914"
Averages		8.50E-03	3.65E-03	0.830		68.6		
std deviations		0.0012	0.0006	0.007		4.7		
std error				0.003				

14	ref mirror	5.37E-03	1.66E-03	0.931		53.3	"11:35:20"	"02-24-1914"
15		5.38E-03	1.66E-03	0.931		53.4	"11:35:29"	"02-24-1914"
16		2.42E-03	1.14E-03	0.909		34.7	"11:35:37"	"02-24-1914"
17		2.27E-03	9.25E-04	0.921		33.7	"11:35:49"	"02-24-1914"
18		2.43E-03	9.63E-04	0.943		34.6	"11:35:58"	"02-24-1914"

Reference mirror data, just before CO2 cleaning of M1, shows Reflectometer is at normal sensitivity

Measurements taken following CO2 cleaning

19	location 1	6.66E-03	2.07E-03	0.834		62.7	"11:43:04"	"02-24-1914"
20		6.67E-03	2.08E-03	0.836		62.6	"11:43:08"	"02-24-1914"
21	2	8.95E-03	2.46E-03	0.839		73.9	"11:43:21"	"02-24-1914"
22		8.96E-03	2.47E-03	0.837		74	"11:43:26"	"02-24-1914"
23	3	6.99E-03	1.82E-03	0.841		65.9	"11:43:37"	"02-24-1914"
24		6.98E-03	1.82E-03	0.841		65.8	"11:43:42"	"02-24-1914"
25	4	6.73E-03	1.77E-03	0.845		64.4	"11:43:49"	"02-24-1914"
26		6.73E-03	1.77E-03	0.842		64.5	"11:43:54"	"02-24-1914"
27	5	4.61E-03	9.94E-04	0.847		55.6	"11:44:08"	"02-24-1914"
28		4.61E-03	9.94E-04	0.848		55.6	"11:44:14"	"02-24-1914"

29	6	6.56E-03	1.59E-03	0.839	64.9	"11:44:28"	"02-24-1914"
30		6.57E-03	1.59E-03	0.836	65.1	"11:44:32"	"02-24-1914"
31	7	7.27E-03	1.76E-03	0.837	68.4	"11:44:44"	"02-24-1914"
32		7.27E-03	1.76E-03	0.833	68.5	"11:44:49"	"02-24-1914"
33	8	6.73E-03	2.30E-03	0.844	61.8	"11:45:00"	"02-24-1914"
34		6.74E-03	2.31E-03	0.838	62.1	"11:45:05"	"02-24-1914"
Averages		6.81E-03	1.85E-03	0.840	64.7		
std deviations		0.0011	0.0004	0.004	5.1		
std error				0.001			

Reflectivity before cleaning: **83.0 % ± 0.3 %**
 Reflectivity after cleaning: **84.0 % ± 0.1 %**
 Improvement in Reflectivity: **0.6 - 1.4 %**
 Improvement in Scattering: **factors 1.3 (0°) and 2 (180°)**
 Surface Roughness improvement is marginal (6%)

The improvement due to cleaning is appreciably less than usual, particularly in scattering.
 Water stains remain and mirror requires a water wash.