40-m Experiment Optics: 2” Dichroic Recycling Cavity Mirrors

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1 Description

2”Ø Flat/Flat dichroic splitters (maximum reflection for 1064nm and maximum transmission for 532nm).

2 Material

Corning HPFS 7980 (high purity fused silica, UV grade)
Grade 0A (Low inclusion class: <0.3 mm^2 cross section, 0.1 mm max. size; Homogeneity < 1ppm)

3 Dimensions

2"Ø +.000/-.005" X .375" ± .020" tk., Plano / Plano

4 Wedge

2 degree ± 5 arc minutes

5 Surface Roughness

Side 1
Super polish
Surface Roughness: <1Å RMS in CA
Surface Quality: 10-5
Side 2
Super Polish
Surface Roughness: <1Å RMS in CA
Surface Quality: 20-10

6 Surface Figure

Side 1
Flat < λ/10 at 632.8 over central 80%

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Side 2
Flat < λ/5 at 632.8 over central 80%

7 Coating

Option – A

Wavelength: 1064nm and 532nm
Angle of incidence: 40°-45°
Side 1
R > 99.9% @ 1064nm for **p** polarization
T > 97% (best effort) @ 532nm for **s and p** polarization
Side 2
AR coating, R < 0.1% (best effort) both for **s and p-pol @ 532nm** and **p-pol @ 1064nm**

Option – B (two different mirrors)

Mirror 1 (PR3)
Wavelength: 1064nm and 532nm
Angle of incidence: 41°
Side 1
R > 99.9% @ 1064nm for **p** polarization
T > 97% (best effort ?) @ 532nm for **p** polarization
Side 2
AR coating, R < 0.1% (best effort) both for **p-pol @ 532nm**
and **p-pol @ 1064nm**

Mirror 2 (SR3)
Wavelength: 1064nm and 532nm
Angle of incidence: 44°
Side 1
R > 99.9% @ 1064nm for **p** polarization
T > 97% (best effort ?) @ 532nm for **s** polarization
Side 2
AR coating, R < 0.1% (best effort) both for **s-pol @ 532nm**
and **p-pol @ 1064nm**

Serial numbers and registration marks shall be scribed or etched on the barrel of the optic for in-vacuum use

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Coating vendor to provide:

1. One 1” dia. witness sample from each coating run
2. Two spectrophotometer graphs of the reflectance and transmittance of the HR coatings; one covering the spectrum from 530nm to 1200nm; the other, with increased sensitivity, showing wavelengths from 900nm to 1100nm
3. Spectrophotometer graphs of the reflectance of the AR coating taken as cited above.