LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

LIGO Laboratory / LIGO Scientific Collaboration

LIGO-T1600104-v2 *LIGO* Date: 4/14/2016

Ultraviolet attenuation in various inorganic black coatings

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Black coated chevron baffle is being designed for attenuation of UV radiation generated by ion pumps. This report summarizes the result of the 200 – 800 nm UV absorption capabilities measurement of six coating samples:

1) Black Nickel on 14 Ga SS substrate
2) Black Nickel on 14 Ga bead blasted SS substrate
3) Undisclosed black coating on 10 Ga Al substrate
4) Undisclosed black coating on 20 Ga SS substrate
5) Chromium oxide on 14 Ga SS substrate
6) Structural black coating on 20 Ga substrate

The experiment was performed using Hitachi U3210 UV/Vis Spectrophotometer at Caltech. Reflectance of the samples has been measured relative to the integrating sphere coated with $BaSo_4$. Reflectance of the integrating sphere is about 95-98%.

A similar reflectance of about 3-6% was observed from all samples except chromium oxide coating (10-15%). Reflectance of the black nickel sample on a bead blasted SS substrate (sample #2) is about 1% lower than reflectance of the same coating on a regular SS substrate (sample #1). Some of the coatings require delicate handling and may need maintenance (particularly #3, #4 and #6)

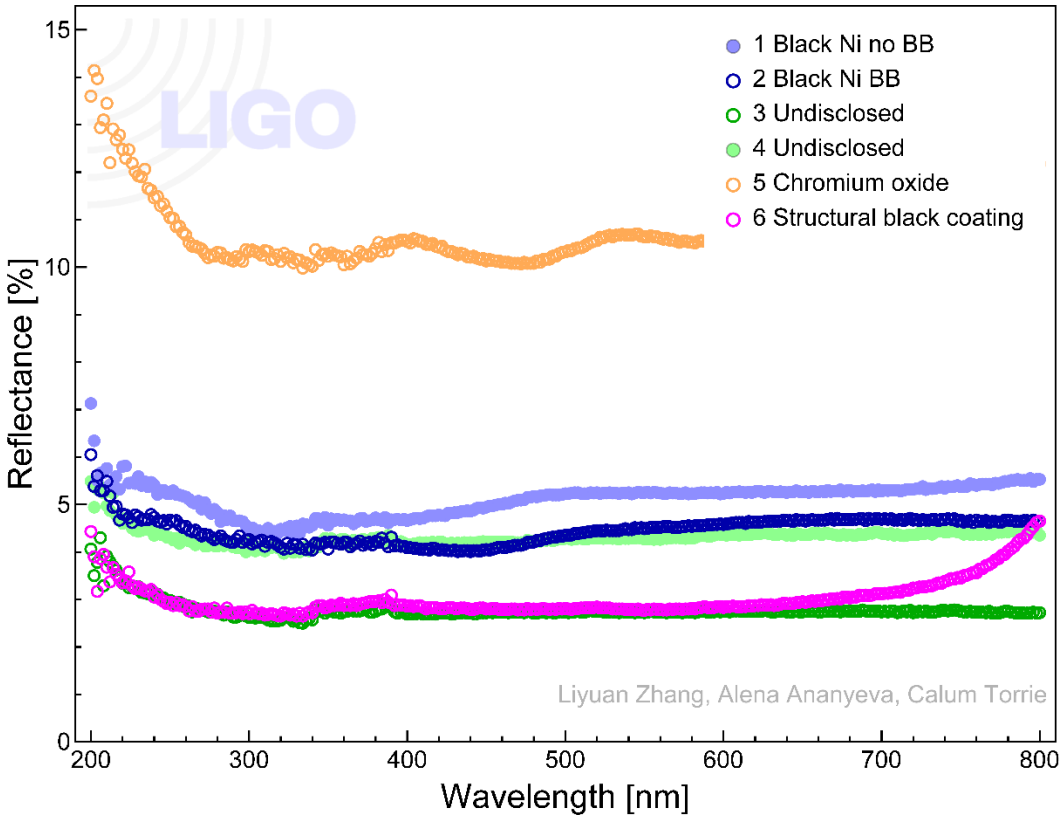

Fig.1 Relative reflectance of various black coatings measured as function of incident photons wavelength.