

**LIGO-T050117-00-D**

Monday, July 11, 2005

## **Visual Inspection of ITM07**

The visual inspection of ITM07 took place at Caltech, in the OTF lab, under a laminar flow bench.

Upon receipt, I cleaned the outside of the aluminum mirror enclosure (cake pan) with methanol before opening it.

There was not visible sign of dirt on the wipe.

### **Visual inspection – AR Surface**

After removing the aluminum cover, observed the sides of the mirror covered with a heavy layer of dust and smudges.

Inspected the AR surface with a high intensity light source in situ. Given the white background at the bottom of the aluminum case, surface imperfections were hard to see. Did not see evidence of a film, however, I noticed what appeared to be a cleaning smear, which can look like a film but in a localized area.

There were a few pieces of lint and quite a few speckles of dust on the surface.

Removed the mirror from the case and placed it on a mirror holding plate (dark background). I saw speckles of dust covering uniformly the entire AR surface.

### **HR Surface**

Turned the mirror to inspect the HR side, did not see a film but a very heavy layer of fine dust particles uniformly distributed and a few pieces of lint.

To be able to compare this mirror surface with the surface of other mirrors, Bill Kells suggested to make an inspection, under the dark field microscope, following the inspection routine performed on other optics, like ITM04 and 40 m mirrors, when we were trying to evaluate scatter, see **LIGO-T030299**

Moving the microscope across the optic, starting and finishing at ~1.5" from the edge, I looked at 36 subsequent (4mm field of view) areas and counted the amount of scatter points observed. Because I did not clean the optic I was not able to distinguish well between a dust particle and/or a coating/glass point scatter. The points ranged from 5 micrometers to 19 micrometers in dia., most falling into the 5 micrometers category. Magnification was 5x.

In ITM07 the minimum of scatter points seen per area were 35, the maximum 94 and I took 36 readings.

As comparison, when I looked at ITM04, I saw quantities of points (per field of view) ranging from 13 points maximum to 1 point minimum. I took 47 readings.

