

**Steve Padin, 02:05 PM 4/5/02, Re: segmented mirror measurements**

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To: Steve Padin <sp@astro.caltech.edu>  
 From: GariLynn Billingsley <Billingsley\_G@ligo.caltech.edu>  
 Subject: Re: segmented mirror measurements  
 Cc: coyne@ligo.caltech.edu, sanders@ligo.caltech.edu, dcc  
 Bcc:  
 Attached:

Hi Steve,

It was a pleasure meeting you. I've run the idea past all concerned parties in LIGO and there is unanimous support for the idea. The caveats that appeared in the e-mail traffic are as follows:

1. We see no need for a monetary arrangement.
2. We would want an agreement that LIGO business takes precedence, and that any damages would be repaired by CELT at their expense.
3. It would be especially nice if a technical paper appeared with LIGO authors included if it is justified by the support that we offer.
4. We will use a different reference flat, to be safe. The calibration that has gone into our standard reference flat is irreplaceable. We can discuss instances where ~absolute measurement is necessary. We have 6 reference flats, all have three-flat calibrations. What the remaining 5 are missing are the thousands of data sets that have been averaged to give the high spatial frequency representation of the reference flat.

Gary Sanders will be informing Tom Tombrello of the collaboration.

I would like to chat with you about mounting schemes, some of our modeling has shown that even very thick mirrors are subject to print-through when supported by even a 9 point mount from below. Reference <http://www.ligo.caltech.edu/docs/T/T970077-00.pdf> There is an approach used by CSIRO that we can employ to mount the mirrors from below.

At 11:04 AM 4/3/02, you wrote:

Hi GariLynn,

Many thanks for taking the time to show me your interferometer setup yesterday.

Here's a rough outline of the measurements I'd like to do to support an initial investigation of a highly segmented telescope mirror. All the measurements would be with uncoated, 100mm dia mirrors, and the required accuracy is ~5nm p-p. The schedule is a very rough estimate at the moment.

June 02

~6 mirrors (3 hexagonal & 3 circular) measured on a horizontal 3-point support.

This is basically a quality control inspection of purchased mirrors.

July 02

Measure actuator print through and gravitational deflection for ~2 mirrors mounted in cells.

Probably 6-10 surface measurements in both horizontal and vertical

positions.

August 02

Test operation of focus and astigmatism warping harnesses.  
Probably ~10 surface measurements, all in horizontal position.

Since this is very much a development project, design iterations on the mirror mounts are likely, and the number of surface measurements could easily double. Let me know if the schedule and quantity of work seem reasonable, and then we can discuss the logistics.

Thanks very much,  
-Steve

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