

# LASER INTERFEROMETER GRAVITATIONAL WAVE OBSERVATORY

- LIGO -

CALIFORNIA INSTITUTE OF TECHNOLOGY  
MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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<b>Creep setup measurement update</b>		
<b>Riccardo DeSalvo, Charlotte Py</b>		

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This is an internal working note  
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California Institute of Technology  
LIGO Laboratory - MS 18-34  
Pasadena CA 91125  
Phone (626) 395-212  
Fax (626) 304-9834  
E-mail: [info@ligo.caltech.edu](mailto:info@ligo.caltech.edu)

Massachusetts Institute of Technology  
LIGO Laboratory - MS 16NW-145  
Cambridge, MA 01239  
Phone (617) 253-4824  
Fax (617) 253-7014  
E-mail: [info@ligo.mit.edu](mailto:info@ligo.mit.edu)

www: <http://www.ligo.caltech.edu/>

## Creep setup measurement update

We have looked at last week of creep setup data.

Half way through the week we increased the temperature of the oven from 30 to 40 degrees.

Now that we decided to upgrade the setup everything looks so much more stable, really hard to believe. Threatening to change everything induced the system to behave. Just like children.

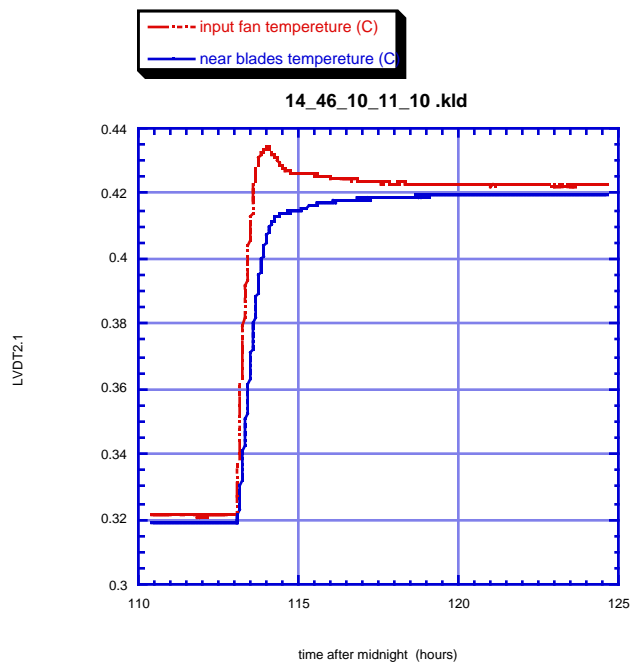
There was only one jump visible during the week, it happened on LVDT 2.3 a dozen hours after we changed temperature and it was a sharp 50 mV jump.

The fact that with the new (faster) computer there are much less software jumps seem to agree with Francesco's suggestion that a bug might accidentally overwrite a pedestal vector when for some reason the CPU gets backlogged. The suggestion is actually to disconnect physically the computer from the web because the CPU might get distracted by pinging or other from hackers. The new faster CPU would be less prone to this problem, but isolating the computer (except for data transfers) may be the right thing to do.

It is still a mystery why now we do not see the Minos crane movements anymore. Maybe the tower footing settled somehow.

Data description;

When we changed oven setting temperature (30-> 40) the air temperature overshoot by about a degree while the blade temperature followed more slowly with no overshoots. Both settled mostly within 6 hours and completely within 12 hours.



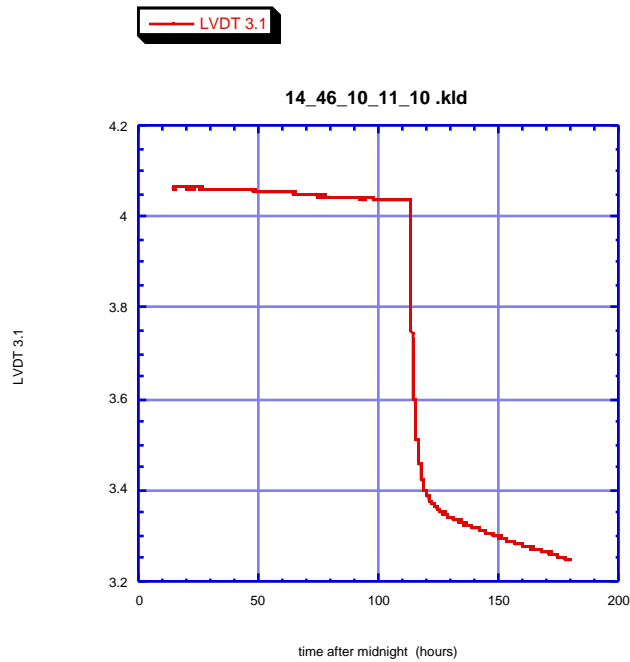
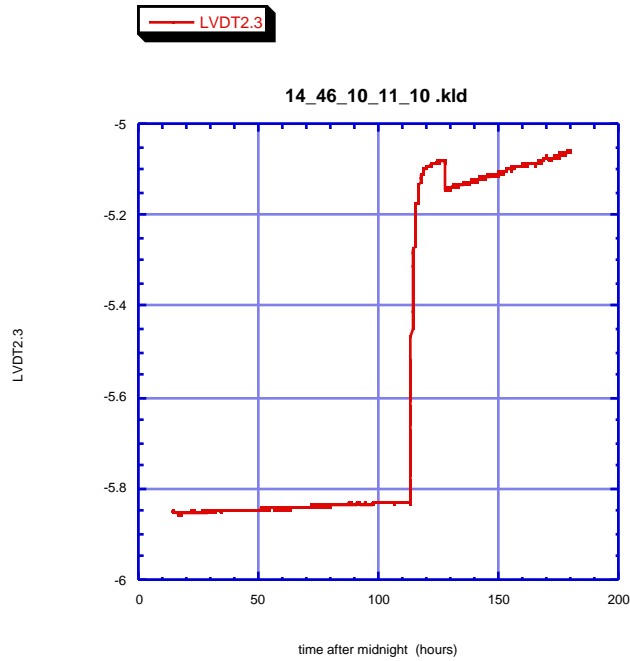
Everything looks fine.

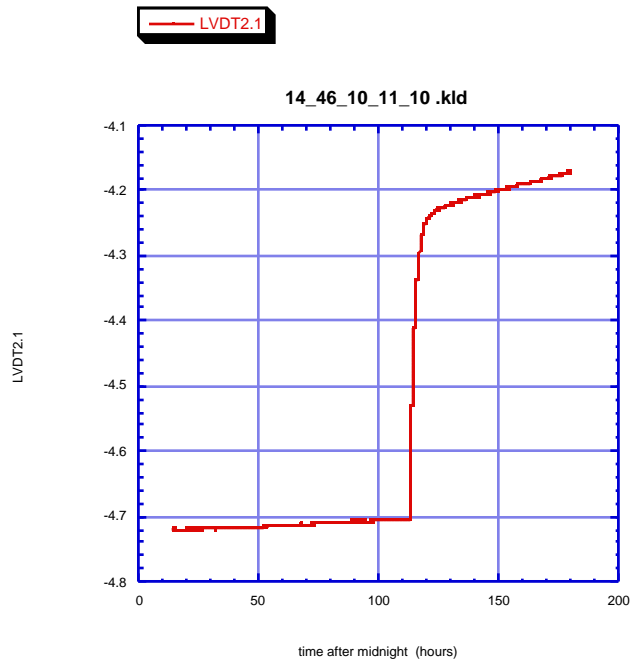
All creep (and witness) slopes were higher after the temperature increase, just as expected, the droop of the blades in the transient was of the same sign while the

witnesses had the opposite slope (plastic expands when warmed and shrinks as it dries up. Unfortunately we do not know the gain of the witnesses. Some signals are incredibly clean, see for example LVDT 2.1, 3.1 or even 2.3 except the jump.

The signal from blade 1.4 was very clean after the jump and somewhat noisy before, evidently we must have straightened its cable that passes close by when we changed the temperature controller setting.

All data below in Volts, divide by 3.5 to get it in mm.





Made linear fits of some data, this is the summary table:

LVDT #	Slope Before mV/hrs	Slope after mV/hrs	Slope ratio	stress
l-3.1	.328	1.84	5.61	961.6
l-3.2	.251	1.84	7.33	1099
l-3.3	.259	1.15	4.44	1600
l-1.3	.219	1.13	5.16	1200
l-1.4	.285	1.45	5.09	1200
l-2.1	.175	.972	5.55	824
l-2.3	.261	1.60	6.13	1099
l-2.4	.382	1.92	5.03	1600
w-1.2	-0.03	.560	-18.6	
w-2.2	.369	1.31	3.55	

and following are the plots, I see no correlation with stress, we seem to be everywhere into regular creep and nowhere into runoff, even at 1600N/mm2!!!

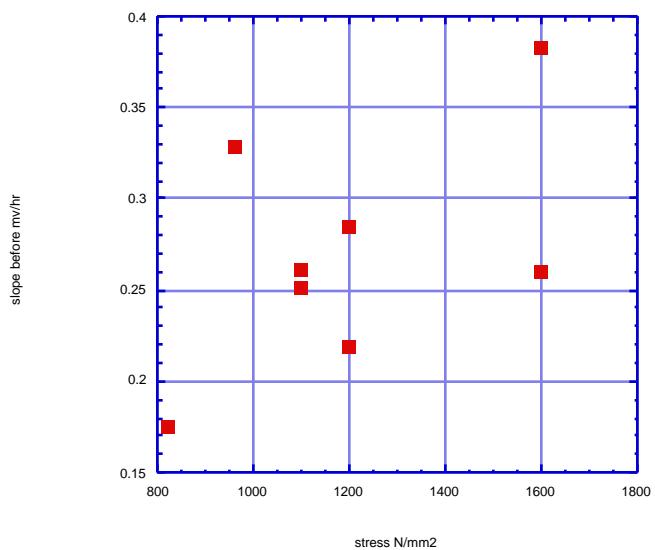
At Virgo we measured only up to 800-1000 and always loaded less than 800 for lack of data, but stress strain measurements (VIR-TRE-PIS-4600-129 06, Oct. 1997) indicate that we can go above 1800N/mm2.

Unless we are all dominated by LVDT shrinking, which would mean that the creep is completely negligible.

Of course until we have good LVDT substrates this is all for fun. Only indications and upper limit can be extracted from this data.

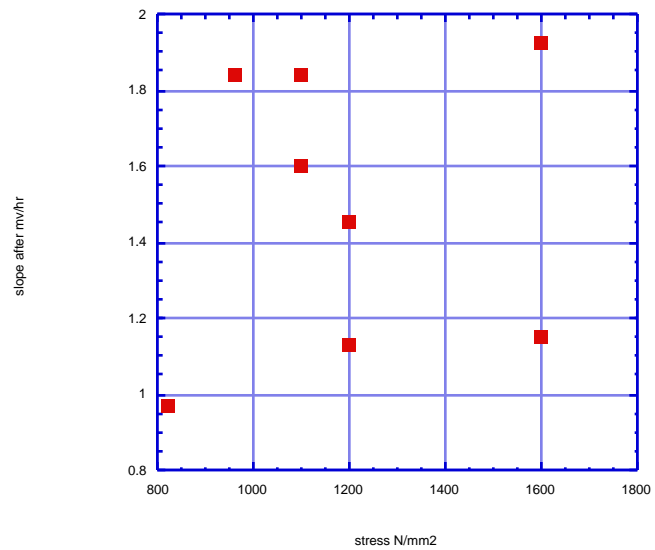
■ slope before mv/hr

slope resume



■ slope after mv/hr

slope resume



■ slope ratio

slope resume

