These measurements of the ETMY charge were done manually using awggui for excitation and diaggui for data processing. The data taken took place between UTC (2014-08-13 21:48:00) and UTC (2014-08-13 23:00:00). This measurement is to check the effect of the ESD cabling configuration, we swapped LL quadrant cable with BIAS going through the ESD LP filter box (at about UTC 2014-08-12 20:00:00) but I have not been able to take data till a day after. Note: I can get some driving of LL although much lower than for the other quadrants (but I think bigger driving that before).

I drove a sinusoidal excitation at 4Hz and amplitude 30000 counts which is equivalent to 91.5 Volts on the ESD ($30000*20*40/2^{18}$, as the DACs drive +-10V and they are 18 bits and then we have an amplifier of Gain 40). Notice that this actuation signal amplitude is divided to the deflection measurements in the tables below to get the standardised plots at the end of this document.

Then we monitor the deflection of the ETMY mass both in Pitch and Yaw looking at the *oplev*. The *oplev* has been carefully centred to the QPD before the measurements.

The magnitudes of the deflection given below are in *urad* and are obtained through a power spectrum plot of the oplev pitch and yaw signals. This power spectrum was measured with a BW = 0.01Hz (actual value is 0.01172) on the range between 1 – 5 Hz and averaged **3** times.

During the measurements the coherence between excitation and Pitch and Yaw was monitored to be sure that the excitation was observed. I also measured the phase (in degrees) of the transfer function between excitation and oplev pitch and yaw (the phase was measured to confirm it is 180 degrees different for the deflections with + and - BIAS). The same excitation was applied to the 4 quadrants of the ESD.

The ETMY pressure at PT-410 is 4e-8 good enough for these measurements. ISI Watchdog ST1 and ST2 green so no much drift of the oplev. Next I show the results:

NOTE: I notice that in this measurement changing the VBIAS does move the oplev spot by 0.5urad which I have not notice before.

Driving UR quadrant:

V BIAS (Volts)	Pitch		Yaw	
	Mag (urad)	Phase (deg)	Mag (urad)	Phase (deg)
+390.5	8.331e-3	-12.5	8.102e-3	-15
+195.3	4.161e-3	-14	3.719e-3	-13.5
-195.3	3.717e-3	167	5.025e-3	164
-390.5	7.904e-3	166	9.792e-3	166

Driving UL quadrant: **The deflection at BIAS +195 has low SNR and 'small' coherence written in brackets (by small I mean smaller than usual which is 0.995 at least).**

V BIAS (Volts)	Pitch		Yaw	
	Mag (urad)	Phase (deg)	Mag (urad)	Phase (deg)
+390.5	4.137e-3	168	1.979e-3	162
+195.3	0.950e-3 (coherence	-14.5	2.533e-3	-9

	0.95)			
-195.3	10.267e-3	-12	10.161e-3	-14
-390.5	14.463e-3	-14	14.013e-3	-13

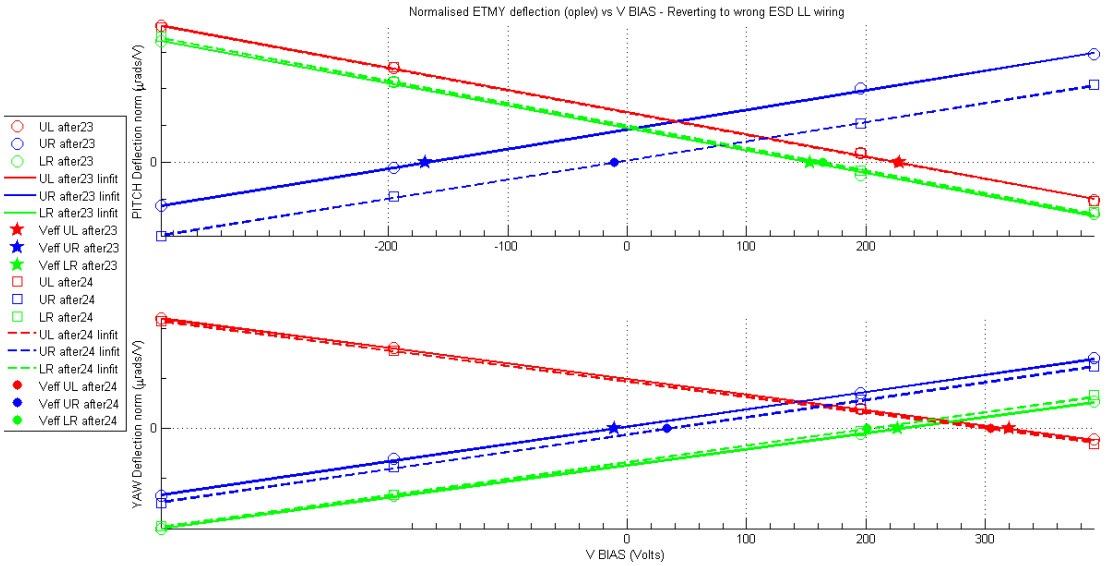
Driving LL quadrant: **This quadrant is not being driven again because we brought the LL driving cable through the ESD LP box as per the previous measurements. However we get some numbers: IGNORE THESE NUMBERS TOO SMALL**

V BIAS (Volts)	Pitch		Yaw	
	Mag (urad)	Phase (deg)	Mag (urad)	Phase (deg)
+390.5	-	-	-	-
+195.3	-	-	-	-
-195.3	0.555e-3 (coherence 0.22)	62	1.01e-3 (coherence 0.0686)	7
-390.5	0.374e-3 (coherence 0.75)	46	0.516e-3 (coherence 0.98)	-159

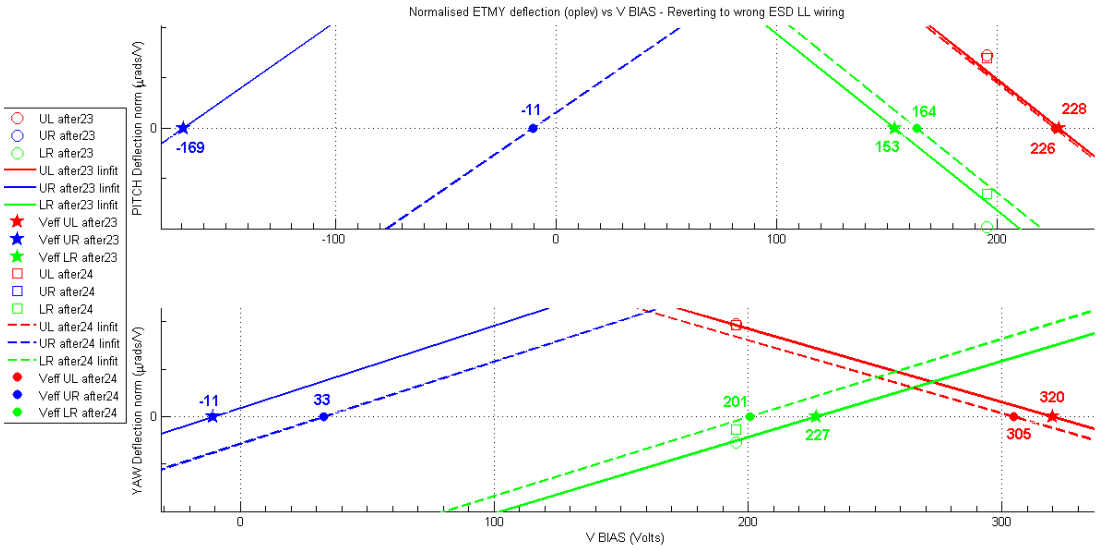
Driving LR quadrant: **Low SNR and coherence when driving with a VBIAS of +195**

V BIAS (Volts)	Pitch		Yaw	
	Mag (urad)	Phase (deg)	Mag (urad)	Phase (deg)
+390.5	5.385e-3	166	4.353e-3	-13
+195.3	0.903e-3 (low coherence 0.92)	168	0.370e-3 (low coherence 0.83)	169
-195.3	8.648e-3	-14	8.720e-3	165
-390.5	13.491e-3	-14	12.773e-3	168

Plotting the above results in the standard way "Normalised deflection [µrad/V] vs V BIAS", the normalisation of the deflection is by the amplitude of the excitation = 91.5Volt. We compare it with the previous measurements (labelled suffix 23, while the current ones is 24):



And next we zoom on the zero crossing:



Interestingly the only difference between the measurement of the plots above is the ESD LL quadrant cabling going through the ESD LP filter box instead of BIAS and they are 1 day apart. We see how most of quadrants do not have a big change in charge with the exception of the quadrant with opposite sign charge which has now charged with the same sign as the rest of quadrants.

	UL	UR	LR
Veff PITCH [V]	226	-11	164
PITCH slope [10^{-7} µrad/V]	-2.6014	2.2564	-2.6454
Veff YAW [V]	305	33	201
YAW slope [10^{-7} µrad/V]	-2.2153	2.4904	2.3825