

## LYRA Dark Currents – Update for Head 2, temperatures above 50°

IED 08 Feb 2011

The function which estimates the dark currents from the temperatures had to be updated. Until now, LYRA experienced values up to 50 degrees, the 51-degree value was extrapolated manually, and the 60-degree value was taken from the laboratory measurements. This had led to gross over-estimation of dark currents in the case of temperatures up to 52-54 degrees during the bake-out period 25-26 Jan 2011.

Since LYRA only delivered a mixture of solar and eclipse values - and no values with covers closed - for this temperature domain, it was tried to estimate the functional dependence with these data. Border conditions were such that the minimum value during the eclipses should meet the dark current, and that the new values could be smoothly attached to the existing values below 50 degrees. The result is not perfect but promising.

The table below shows the current values used for the linear interpolation of head2 dark currents in the latest version (BSDG=0.5) of *calib\_lev2.pro*. Values up to 30 degrees were taken from the lab measurements, like the 60-degree value, cf.

[http://solwww.oma.be/users/dammasch/FT\\_TV\\_General.xls](http://solwww.oma.be/users/dammasch/FT_TV_General.xls)

The four figures below show the values in a format similar to earlier reports, cf.

[http://solwww.oma.be/users/dammasch/IED\\_20101201\\_DarkCurrentTemperatureFit\\_Update.pdf](http://solwww.oma.be/users/dammasch/IED_20101201_DarkCurrentTemperatureFit_Update.pdf)

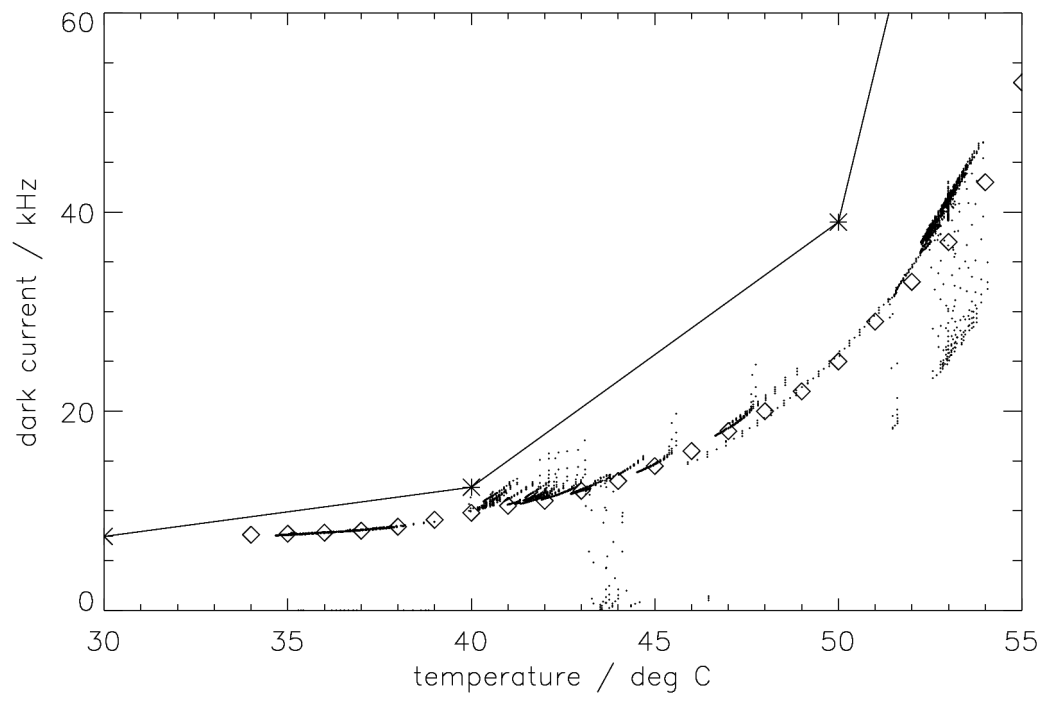
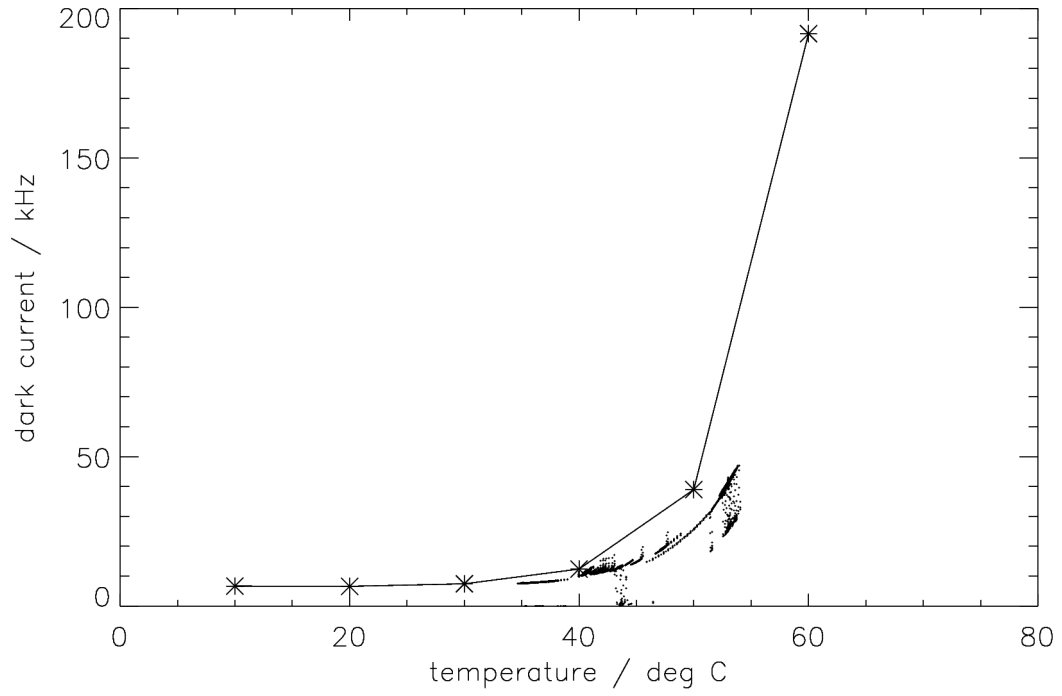
The two figures at the end demonstrate the effect of the dark-current removal in an example: The month of January 2011 is shown before and after calibration (i.e., dark-current subtraction, as well as degradation-trend removal, and conversion to physical units).

tmp	-40	-30	-20	-10	0	10	20	30				
dc1	6.84	6.67	6.80	6.97	6.74	6.66	6.60	7.42				
dc2	6.25	6.29	6.29	6.33	6.35	6.37	6.38	6.39	(from lab)			
dc3	6.18	6.21	6.23	6.25	6.26	6.27	6.29	6.33				
dc4	6.17	6.10	6.26	6.38	6.51	6.63	6.73	7.12				
tmp	34	35	36	37	38	39	40	41	42	43	44	
dc1	7.60	7.70	7.80	8.00	8.40	9.10	9.80	10.5	11.0	12.0	13.0	
dc2	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.50	(from space)
dc3	6.42	6.44	6.46	6.49	6.53	6.56	6.62	6.68	6.75	6.83	6.92	
dc4	7.60	7.80	8.00	8.30	8.60	9.00	9.40	9.90	10.5	11.2	12.0	
tmp	45	46	47	48	49	50	51	52	53	54	55	
dc1	14.5	16.0	18.0	20.0	22.0	25.0	29.0	33.0	37.0	43.0	53.0	
dc2	6.50	6.50	6.50	6.50	6.50	6.50	6.50	6.40	6.40	6.40	6.40	(from space)
dc3	7.05	7.20	7.40	7.60	7.80	8.10	8.40	8.80	9.20	9.70	10.5	
dc4	13.0	14.4	15.9	17.4	19.5	22.5	25.0	29.0	33.0	37.0	43.0	
tmp	60											
dc1	191.60											
dc2	6.39	(from lab)										
dc3	21.31											
dc4	169.45											

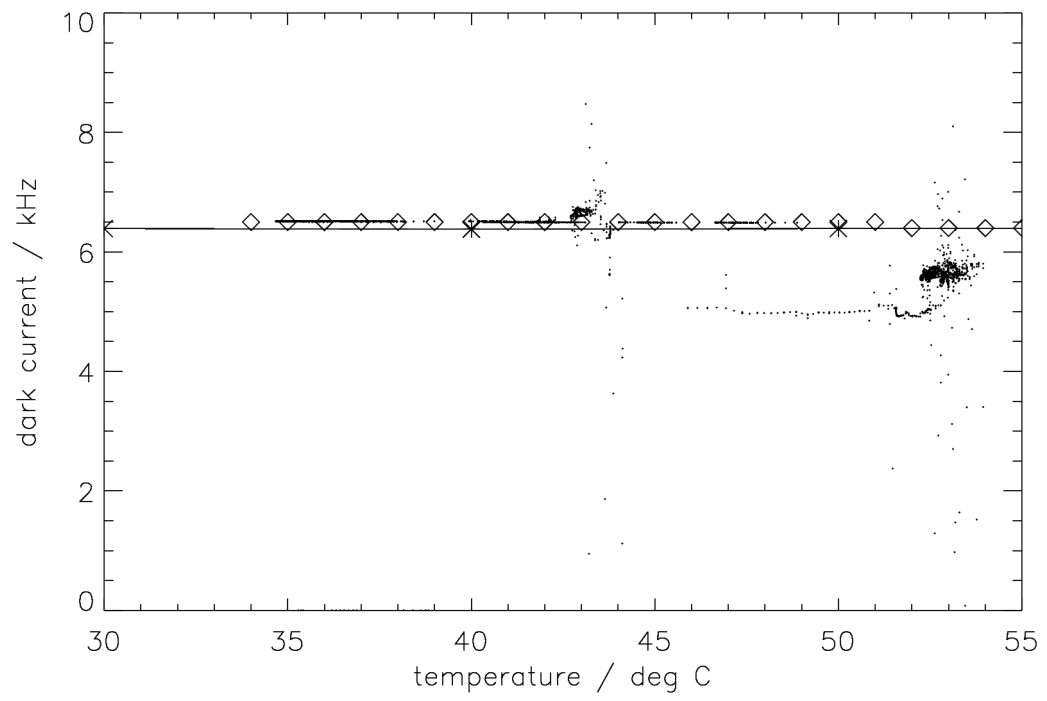
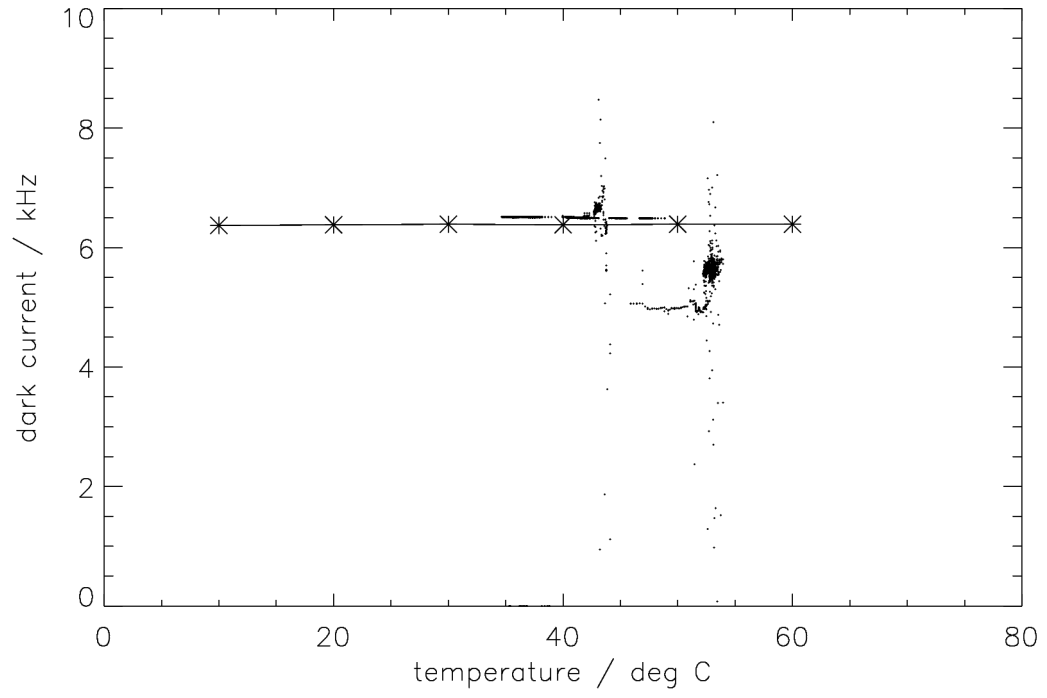
tmp = temperature in degree C

dc1 (, 2, 3, 4) = dark current of channel 2-1(,2,3,4) in kHz

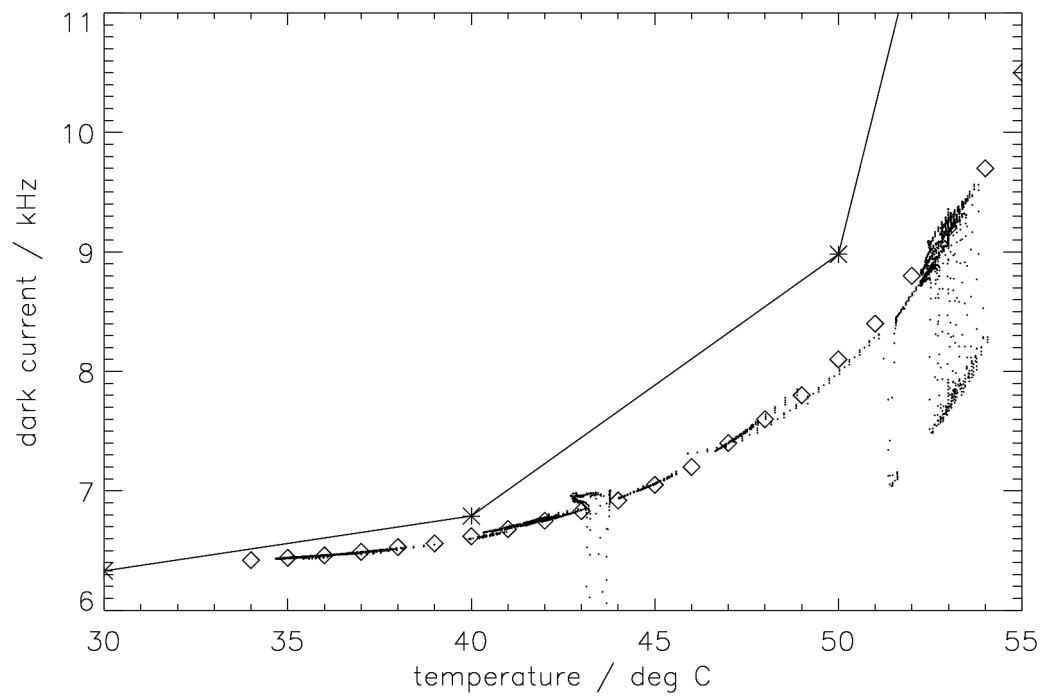
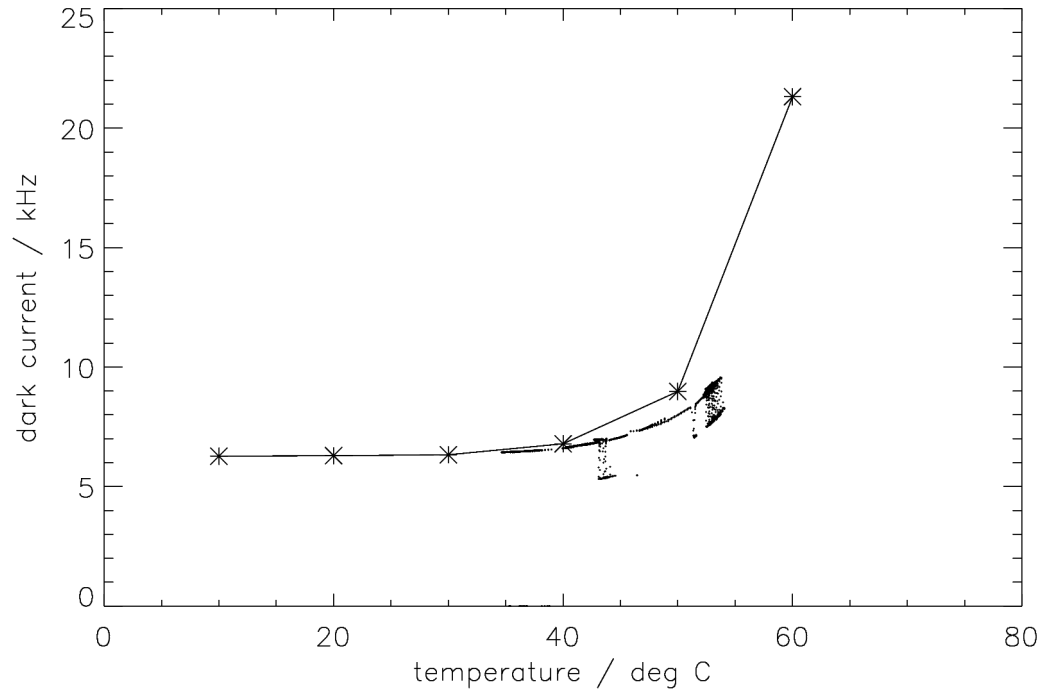
Channel 2-1



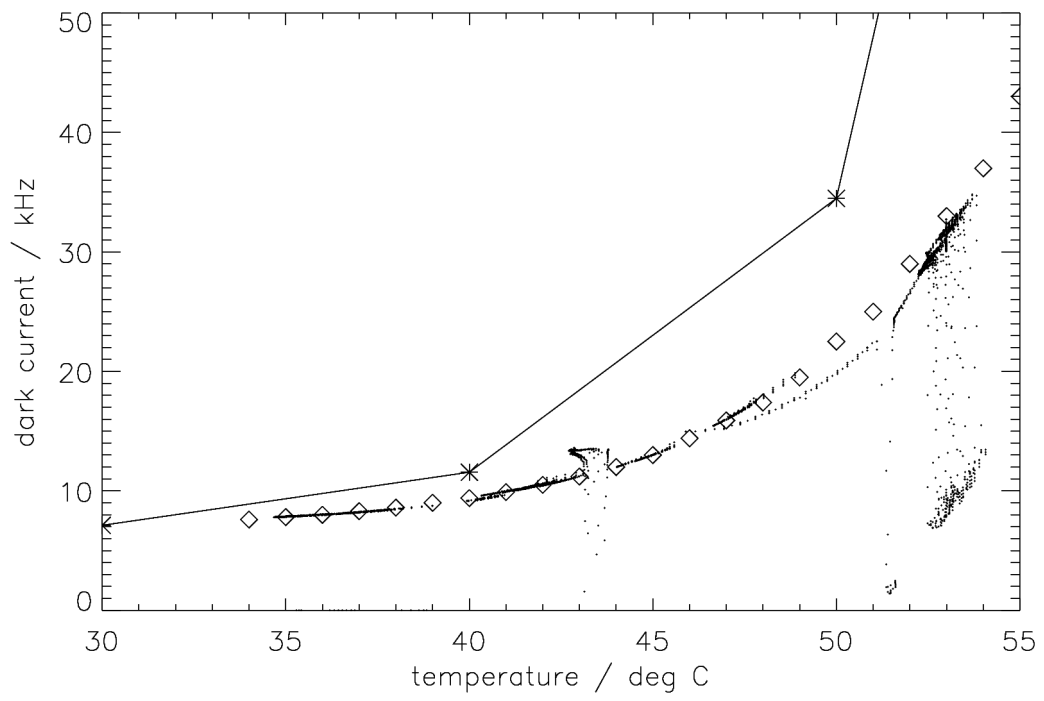
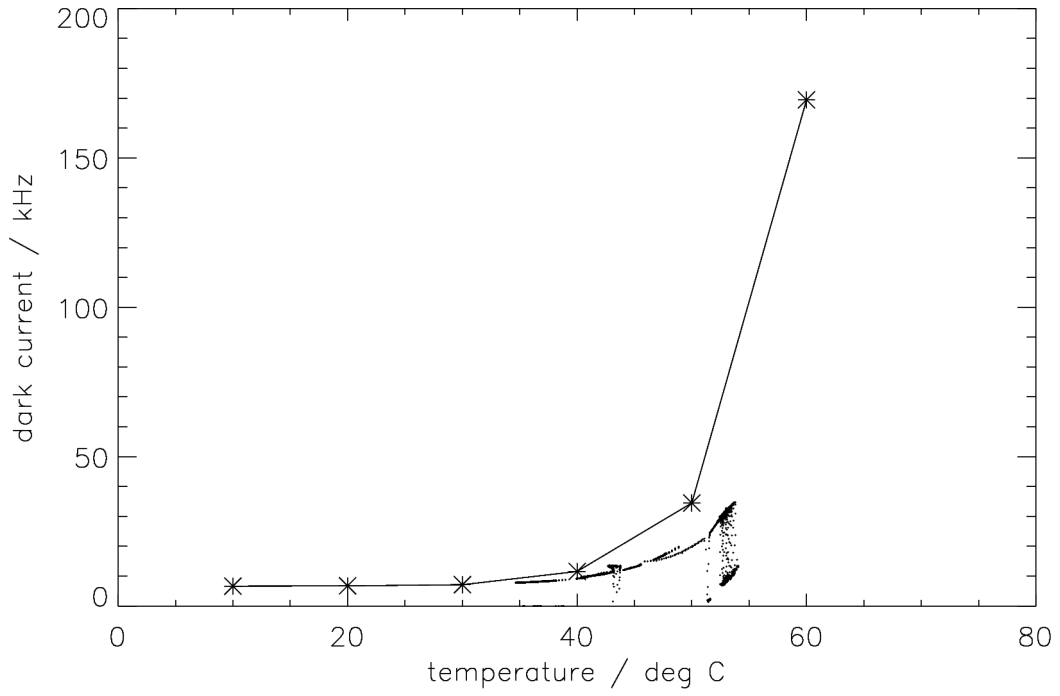
Channel 2-2



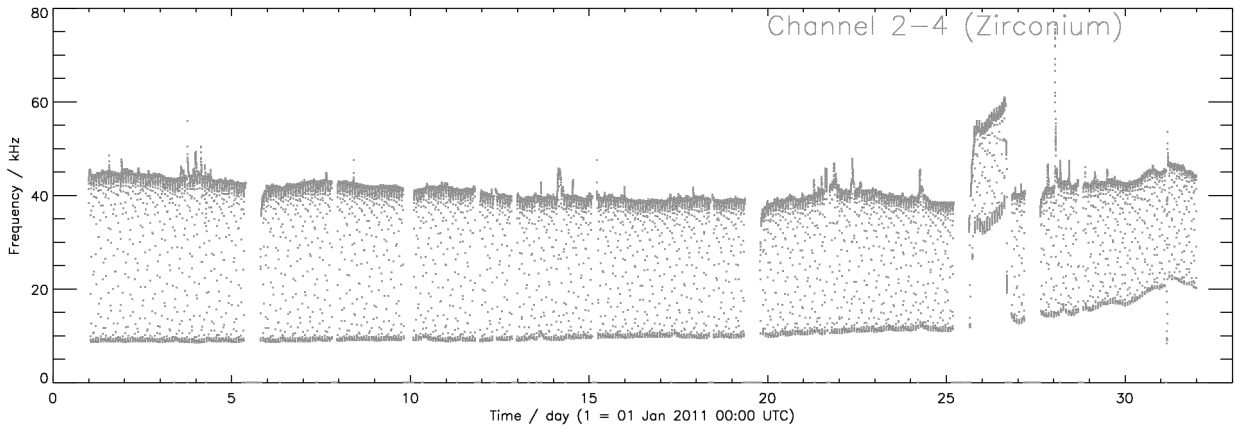
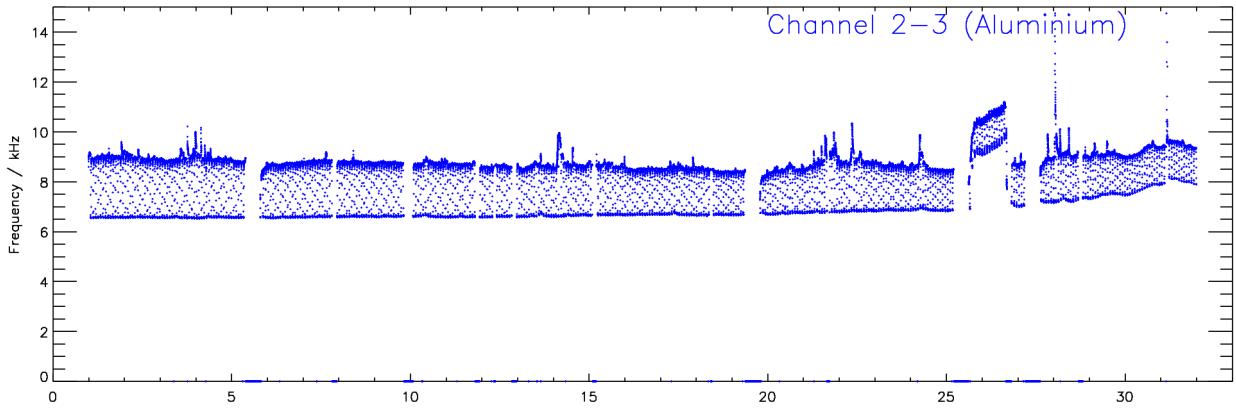
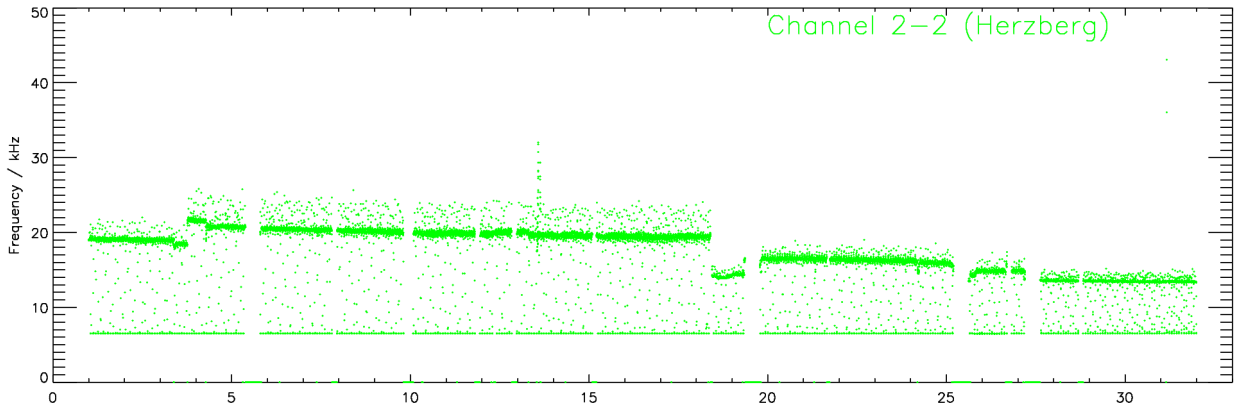
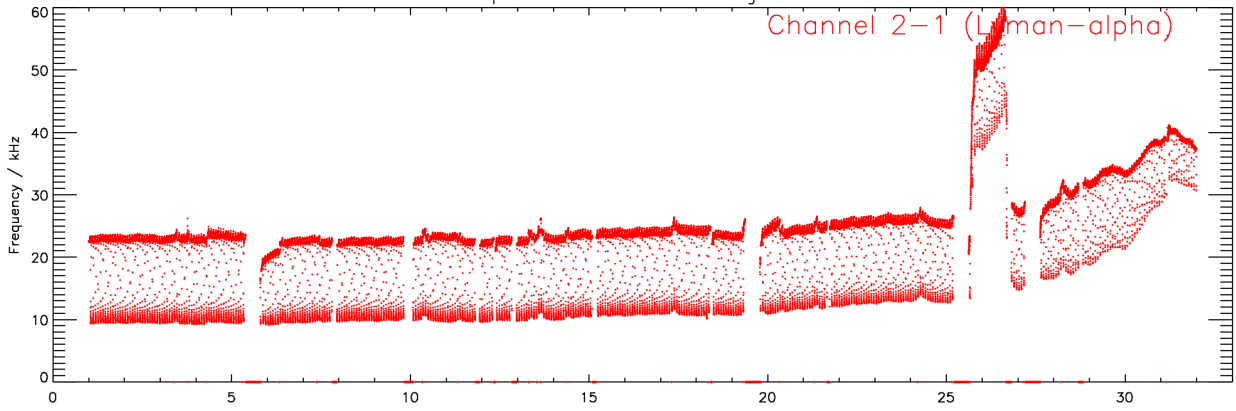
Channel 2-3



Channel 2-4



Development of LYRA Head 2 during Jan 2011



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