

Discussion slides

Discussion on possible ideas of vibration measurements on IP-BPM optical table support and possible interferometer measurements at KEK





LAPP-CERN involvement



- Already done:
 - Purchase by LAPP of 15 Guralp 6T for 52 000€.
 - Purchase by CERN of special low noise long cables
 - DAQ system developed by CERN
- Still to do:
 - Instrumentation preparation by LAPP-CERN: if system with 15 sensors and signal quality OK
 - LAPP installation of cables, sensors and tests at KEK
 - Determine Labview-EPICS connection : CERN, Glenn and LAPP
 - Data handling CERN-LAPP



Absolute velocity/acceleration studied at LAPP:

Type of sensors	Electromagnetic geophone	Electrochemical geophone	Piezo	electric accelerom	etters	Geophone
Model	GURALP CMG- 40T	SP500-B	Wilcoxon	393B12	4507B3	Guralp 3ESP
Company	Geosig	PMD Scientific	D1 0. 171	PCB	Brüel & Kjaer	
				Piezotronics		
Sensibility	1600V/m/s	2000V/m/s	10V/g	10V/g	98mV/g	2000V/m/s
Frequency range	[0.033; 50] Hz	[0.0167;75] Hz	[0.01; 100] Hz	[0.05; 4000] Hz	[0.3;6000] Hz	[0.03; 50]Hz
Measured noise	0.05nm	0.05nm	0.25nm	11.19nm	100nm	
(f > 5Hz)			>50Hz: 0.02nm	>300Hz: 4.8pm		

Sub-nanometre measurements













A.Jeremie

FJPPL-FKPPL ATF2 at LAL 10-13/02/ 2013

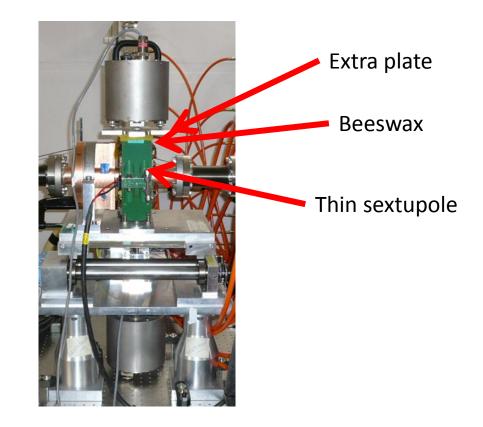
Sensor characteristics



niation	Velocity output bandwidth	1 s – 100 Hz (Model CMG-6T-1),		
ristics	г	<u>10 s – 100 Hz (Standard) or</u> 30 s – 100 Hz		
	Velocity output sensitivity	2 × 1200 V/m/s, (Standard)		
		2 × 2000 V/m/s or		
		2 × 1000 V/m/s		
	Peak output	±10 V (20 V peak-to-peak)		
	Optional high gain sensitivity	2 × 10000 V/m/s (adjustable)		
	Lowest spurious resonance	450 Hz		
	Linearity	> 90 dB		
9	Cross-axis rejection	> 65 dB		
	Electronics noise level	-172 dB (rel. 1m2s-4Hz-1)		
		404		
	Operating temperature	-40 to +75 °C		
	Temperature sensitivity Mass recentring range	< 0.6 V per 10 °C ±3 ° from horizontal		
	Mass recenting range Materials	Hard anodised aluminium case		
		Gold plated contacts		
		O-ring seals throughout		
	Case diameter	154 mm		
	Case height (with handle)	207 mm		
	Weight	2.49 kg		
	Power supply	10 – 36 V DC		
	Optional low power sensor	5 V DC supply (output ±4.5 V)		
	Current at 12 V DC	38 mA		
	Calibration controls	Common signal & enable lines		
		exposed on sensor connector		
	Offset zeroing	Adjustable through case		
	Optional remote control Optional accessories	Offset zeroing with DC motors Handheld Control Unit		
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A.Jeremie

Possible installation?





A.Jeremie

FJPPL-FKPPL ATF2 at LAL 10-13/02/ 2013

⁶Vibratory study of an ATF2 sextupole with its supports

Experimental set-up

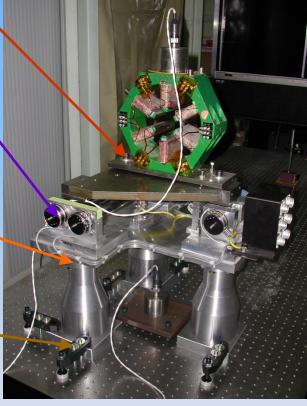
Setting of the magnet level

Movers for movement of the magnet around the beam axis

Insertion of spacers for coarse magnet alignment _ in the vertical axis

Coarse magnet alignment in the horizontal axis





ENDEVCO 86 accelerometers (13Hz - 100Hz)

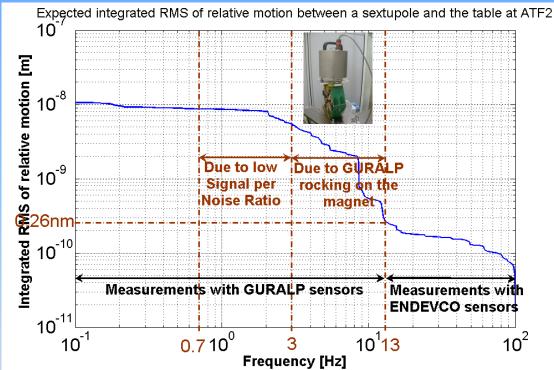
B.Bolzon 2008

GURALP geophones (0.1Hz - 13Hz)

GURALP positioning on a T-plate , fixed with beeswax on the magnet

⁷Vibratory study of an ATF2 sextupole with its supports

Integrated RMS of sextupole relative motion to the table

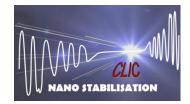


✓ Between 0.7Hz and 13Hz: inaccurate measurements
(low Signal to Noise Ratios and GURALP rocking on the magnet)

✓ **Above 13Hz:** relative motion of 0.26nm

Very good compared to ATF2 tolerances (10nm)!!!B.Bolzon 2008

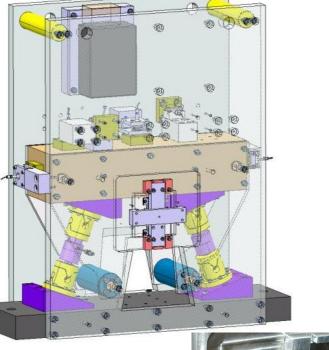
X-y prototype: Nano positioning Resolution, precision, accuracy











Optical ruler

Actuators equipped with strain gauges





saclay

