

PMD/eentec nonmagnetic MET seismometer, tests in magnetic field at SLAC

April 12, 2005

Andrei Seryi

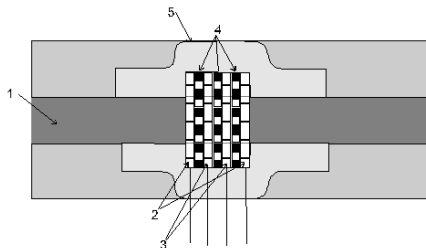


SP400U



SP400U

● MET sensors tested in April 2004



- 1 - Electrolyte channel
- 2 - Platinum mesh anodes
- 3 - Platinum mesh cathodes
- 4 - Microporous spacers
- 5 - Housing

Case diameter	137mm
Passband	0.1 – 50 Hz, velocity flat response
Case diameter	137mm
Case length	238mm
Weight	~6kg

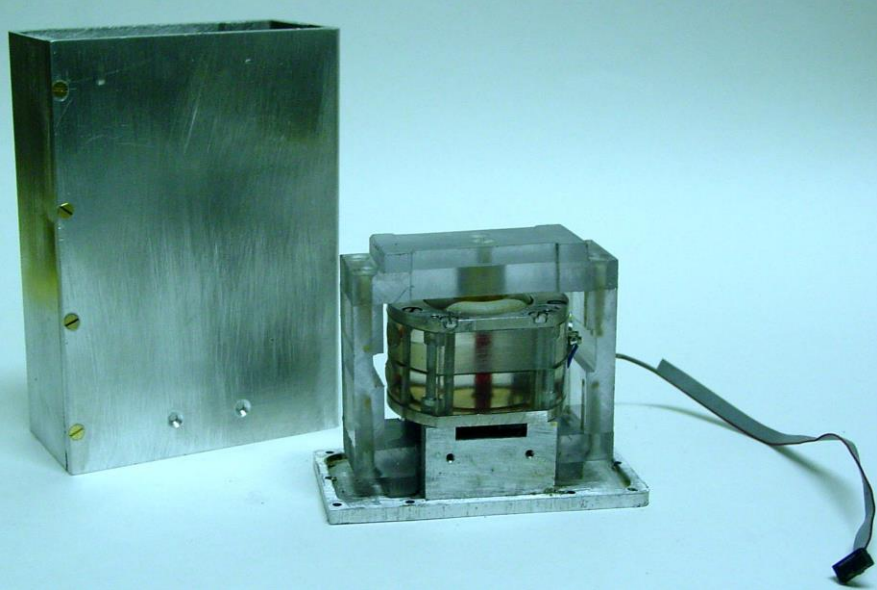


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standard and compact versions

- Two compact sensors provided to SLAC in March 2005 as a results of SBIR program. The size is 5*10*15cm, as requested in specification



PARAMETER	SCS-1
Operating principle	Proprietary Electrochemical Sensor ^[1]
Output signals	Velocity flat response
Output swing:	min. ± 12 V (24V p-p) differential
Dynamic Range	144 dB
Passband	0.1 – 80 Hz (3dB); -6dB at 100 Hz
Generator constant	2000 V/m/s
Maximum installation tilt	Fully operational in any orientation
Mechanical resonances	none below 140Hz
Temperature range	-12 to + 55 °C
Case dimensions	Approx. 100 x 50 x 150mm
Power	Nominal 12Vdc; max. 10mA;

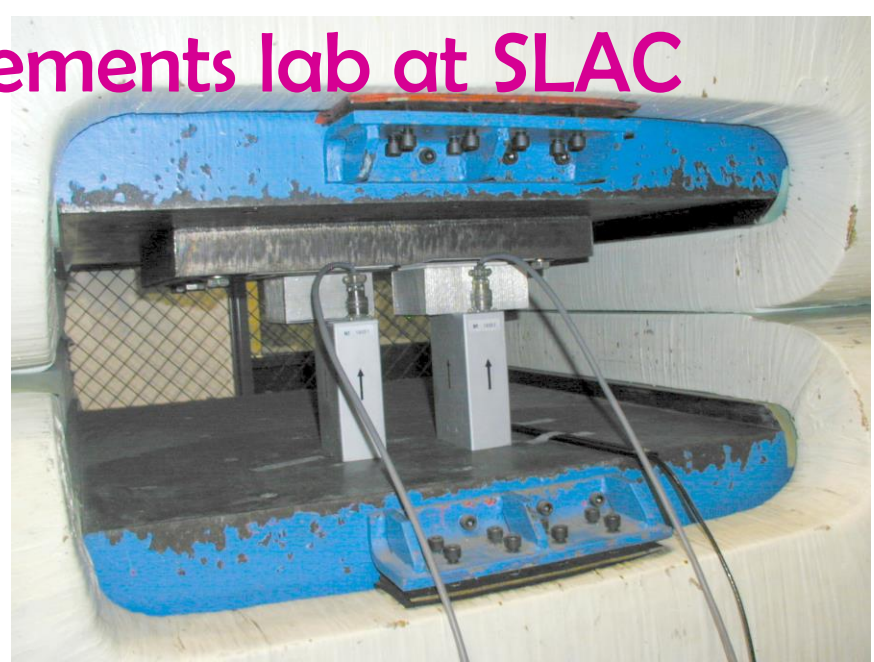
^[1] US patent No.6,576,103

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 Bloomfield, CT 06002
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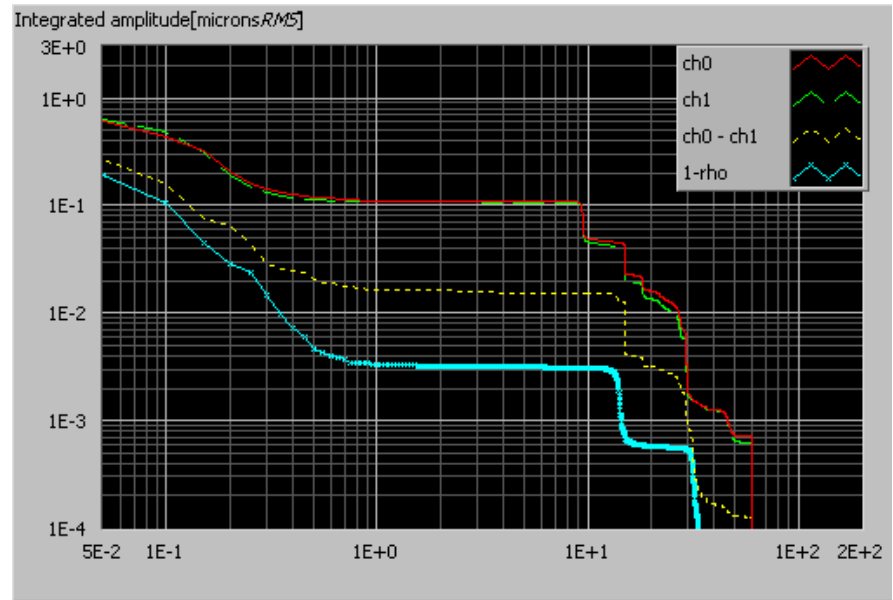
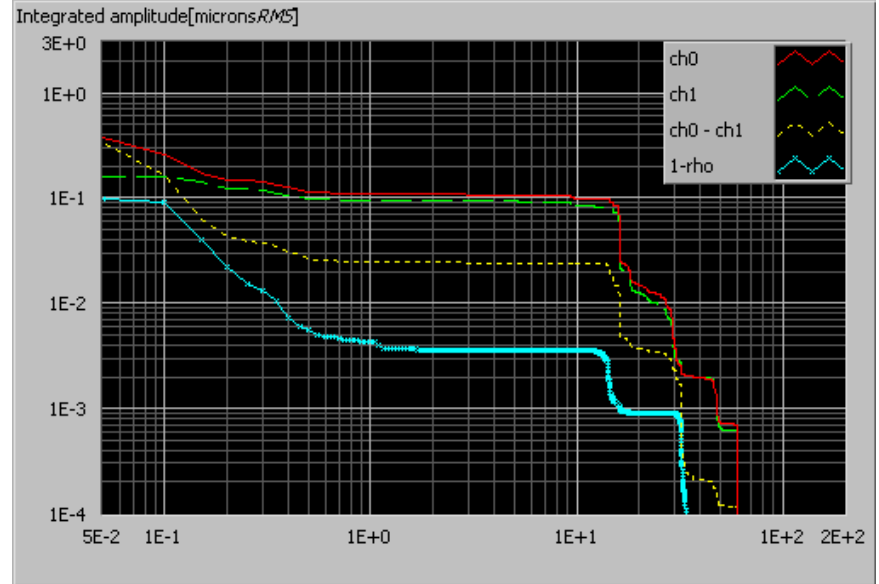
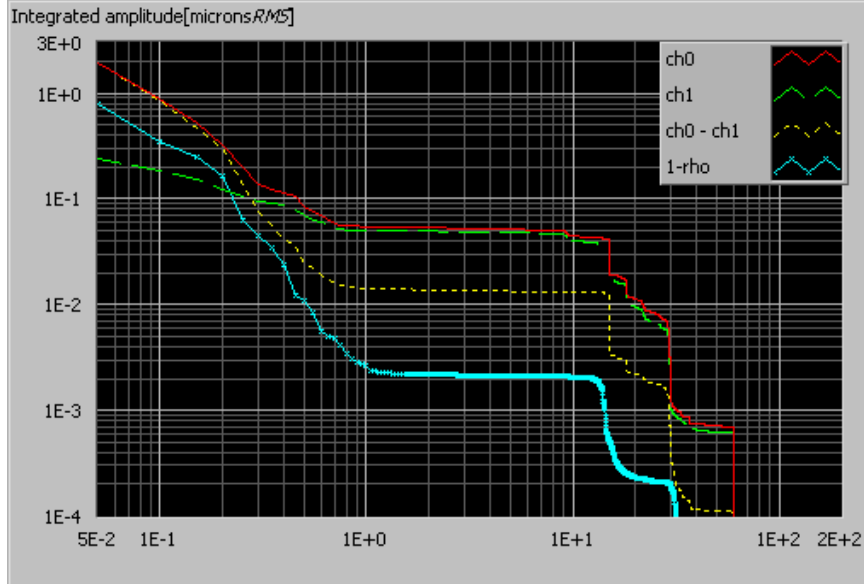
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Tests in magnetic measurements lab at SLAC



MET April 12, 2005

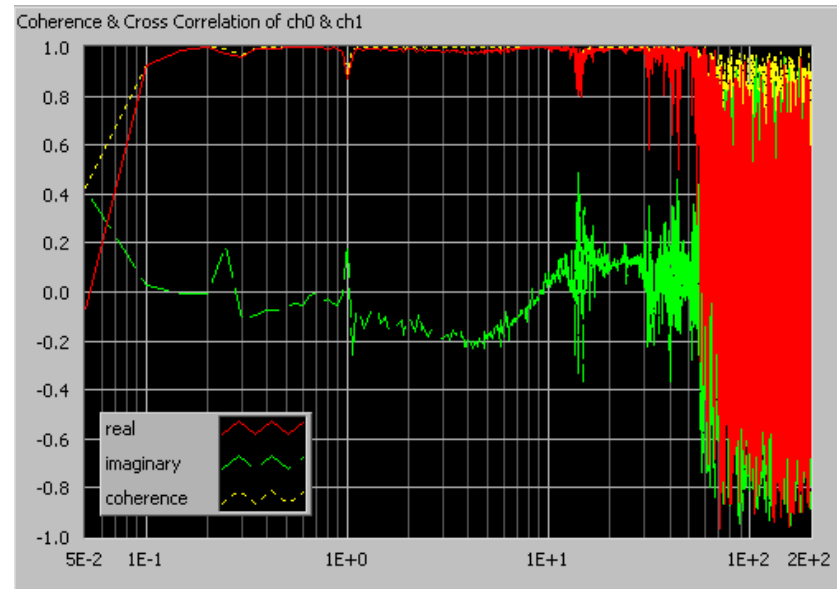
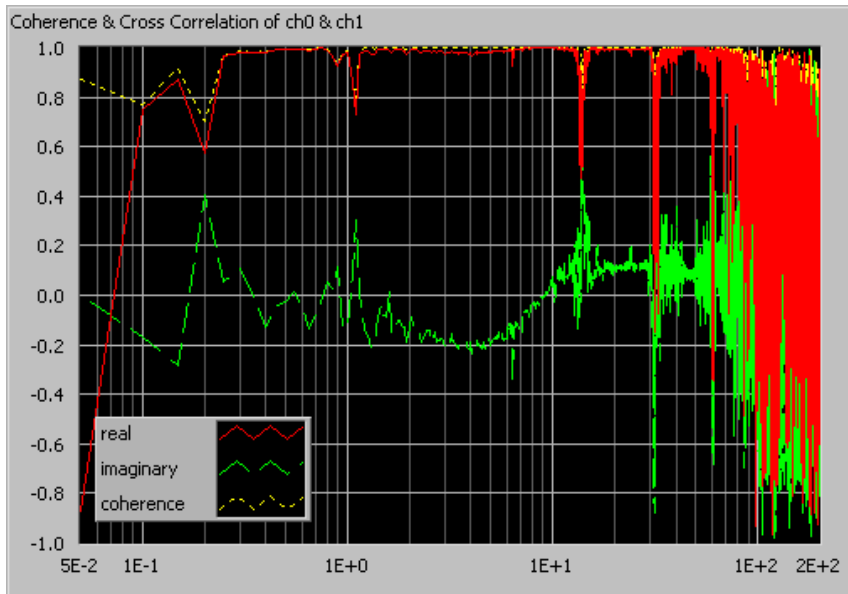
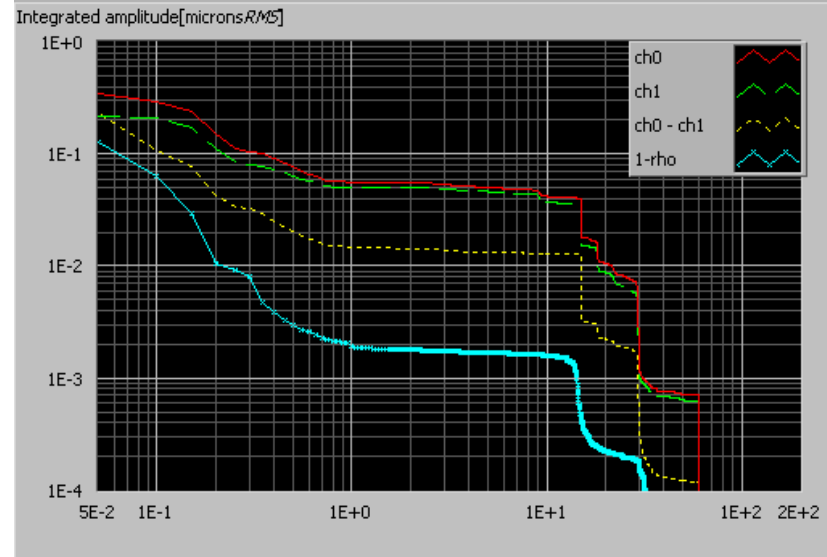
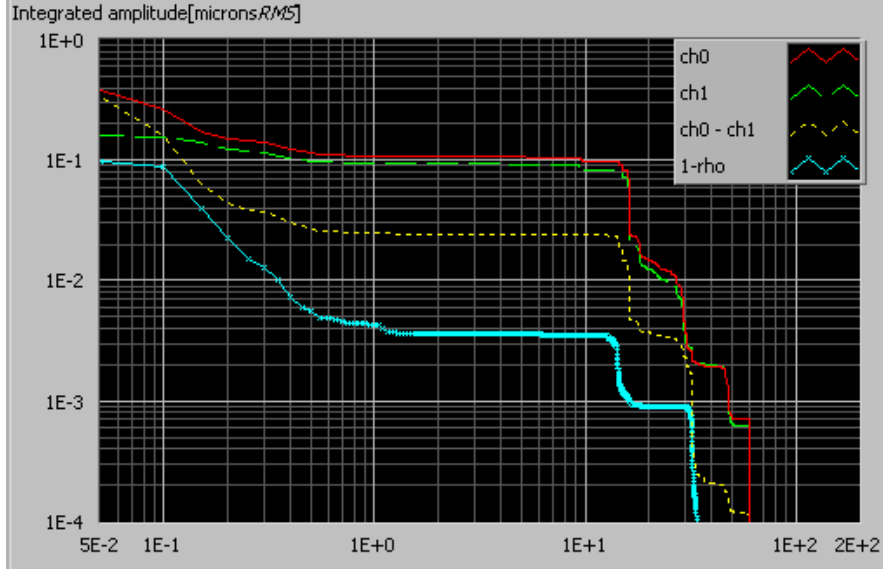
Thanks to Scott Anderson and Zack Wolf for help with measurements



Case 1, B=0T.
 01111900.ap5 01112600.ap5 01112200.ap5

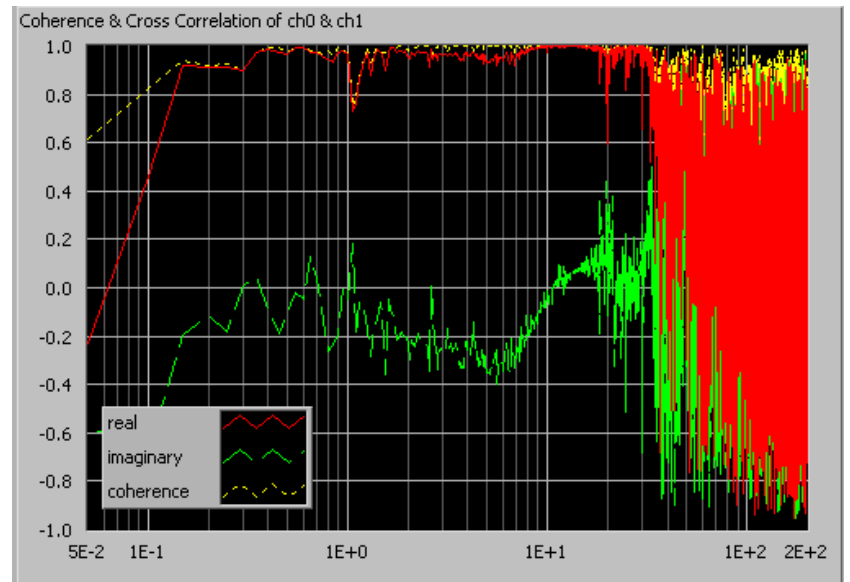
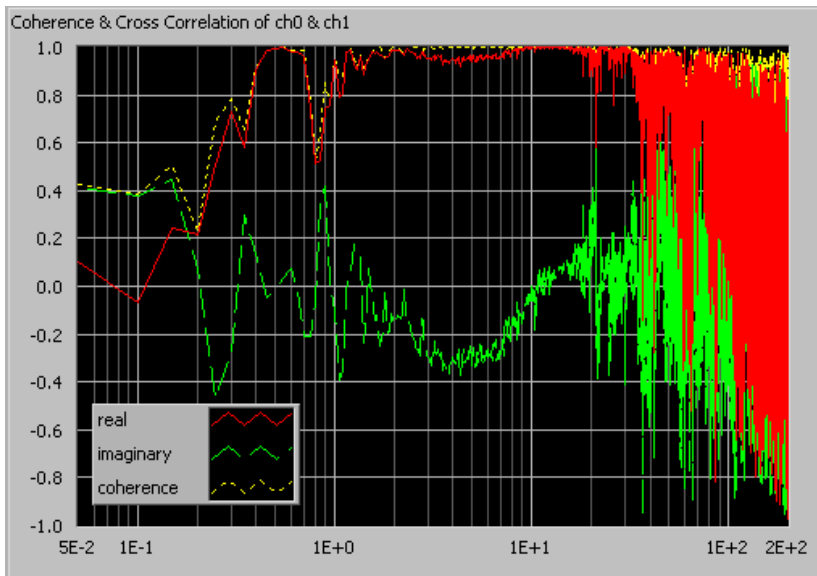
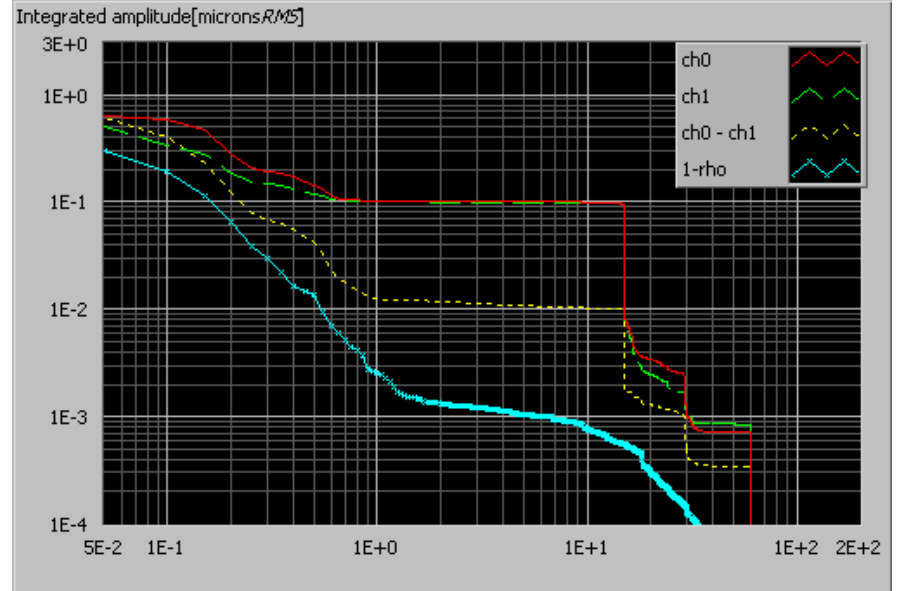
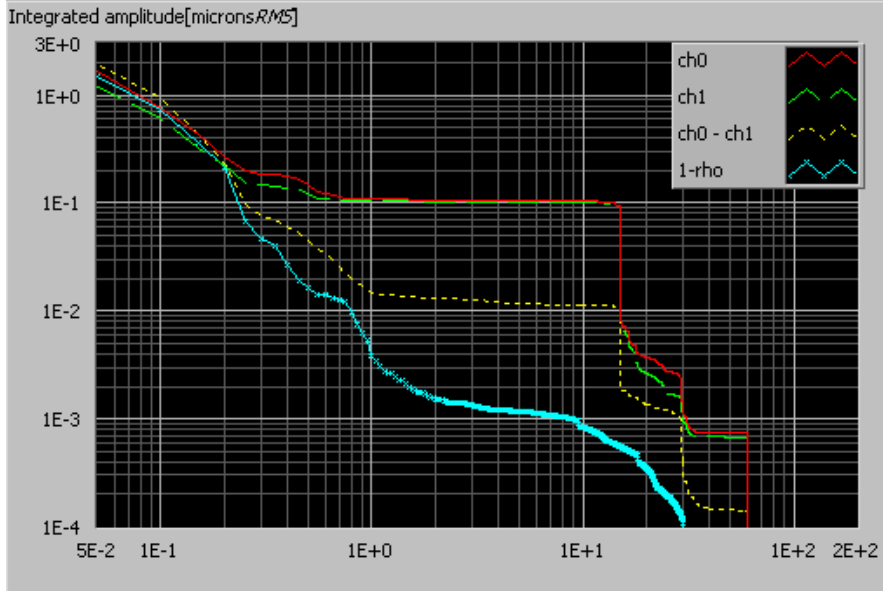
Variation of conditions in the building. Three consecutive measurements. The variation of conditions is noticeable and explains small difference of spectra measured with and without the magnetic field.

Spectra assumed 2000V/(m/s) sensitivity constant. (Roll-off below 0.1Hz and above 80Hz was ignored in the analysis.)



Case 1, both vertical.
Left: 01112600.ap5, B=0T

Right: 01115400.ap5, B= -0.995T



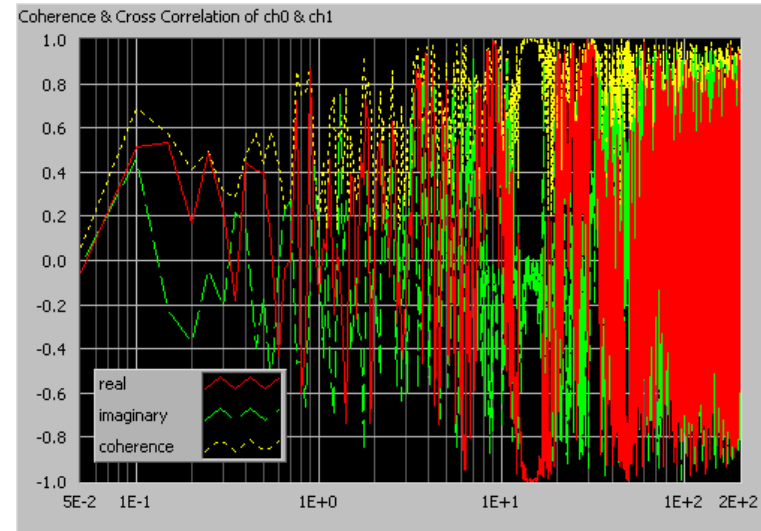
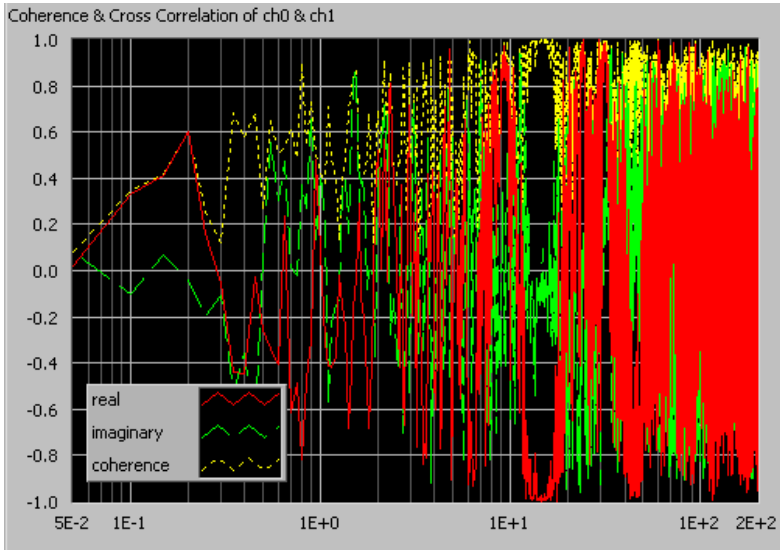
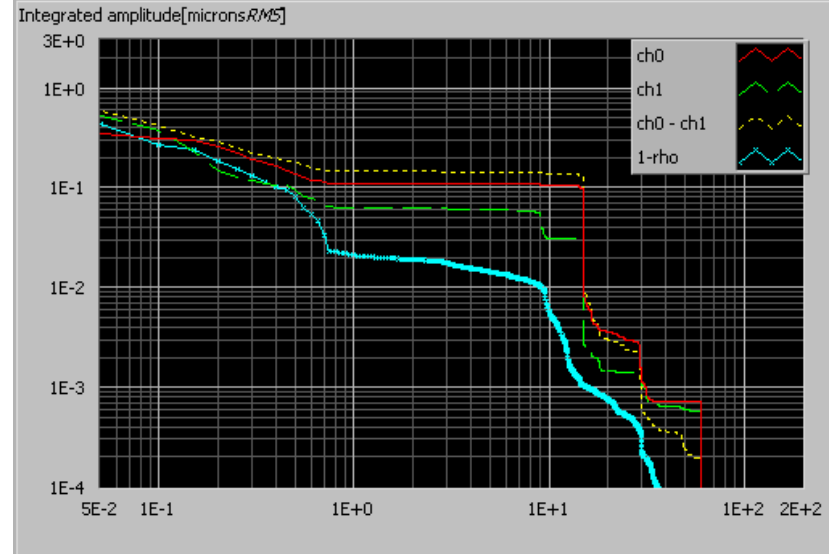
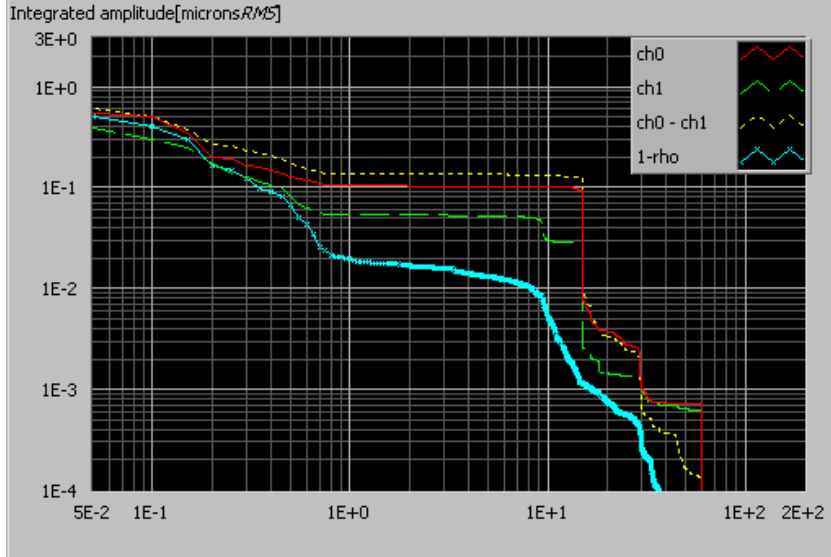
Case 2: horizontal parallel

Left : 01120200.ap5

B=0T

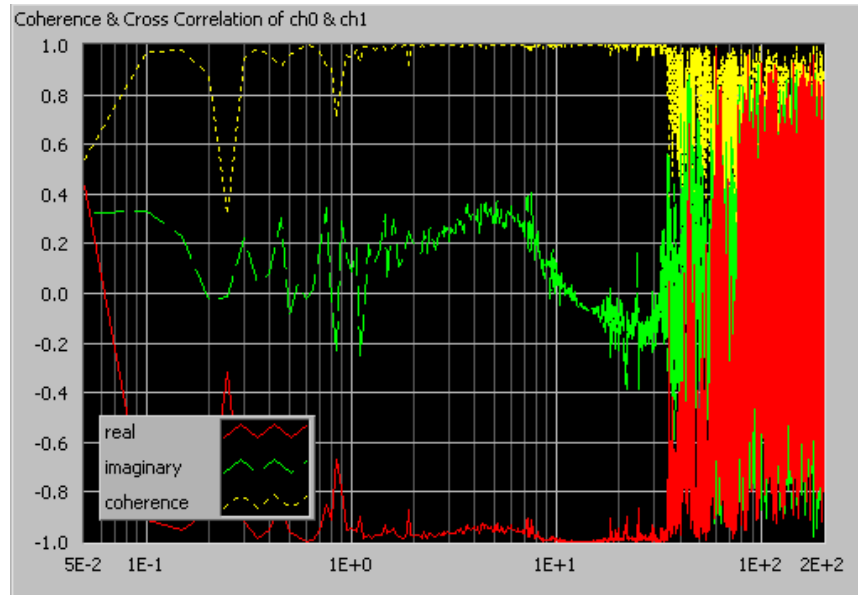
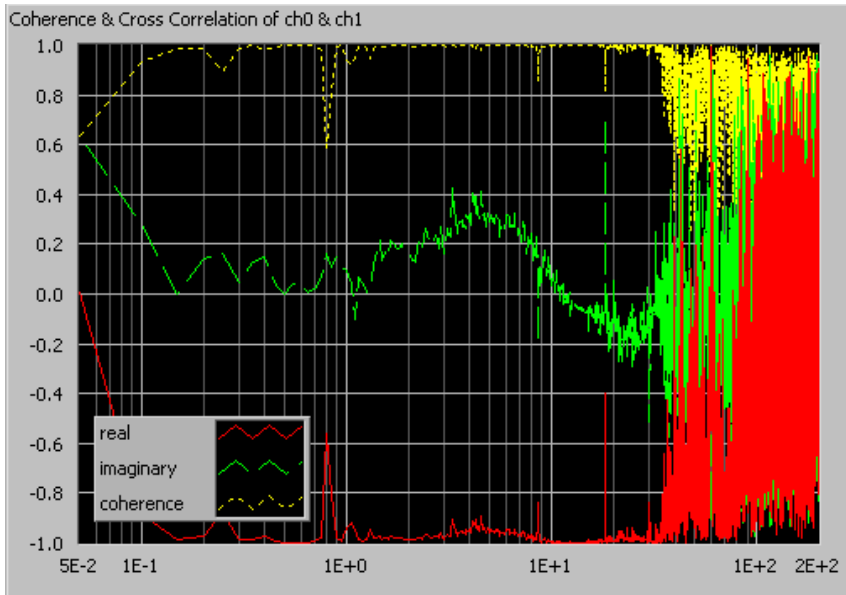
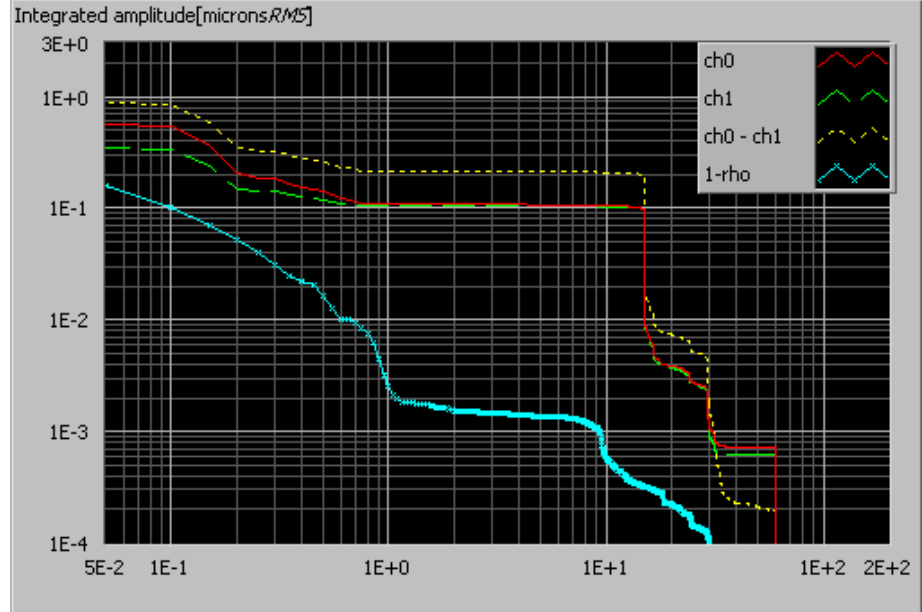
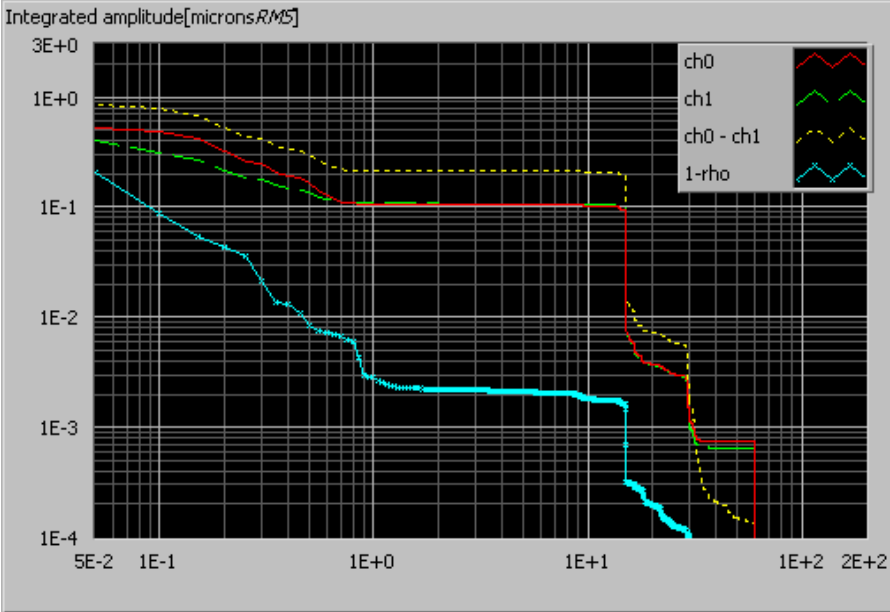
Right: 01121400.ap5

B= -1.0 T



Case 3: Horizontal orthogonal
 Left: 01122622.ap5 B=0T

Right: 01123645.ap5 B=-1.0T



Case 4: horizontal anti-parallel
 Left: 01124040.ap5 B=0T

Right: 01125133.ap5 B= -1T

Conclusion

- There is no visible influence of high magnetic field on the MET sensors, so, they can be used as a prototype sensors for the IR region of ILC, and can also be used for measurements at IR of existing colliders (such as B-factories)
- In order to measure the noise level, one need to take these sensors to quiet place, e.g. sector 10, and compare with STS-2 or other sensors (could be a good practice for a summer student)