



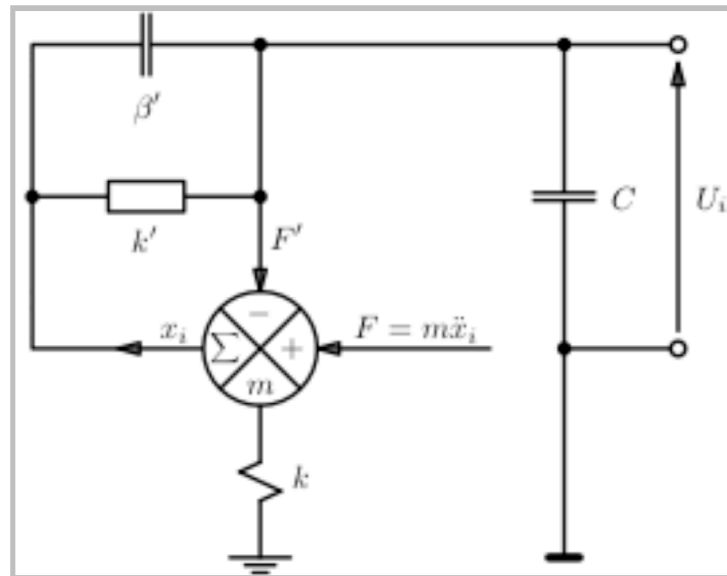
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WP 7 - Metrology and Stabilisation: Ground Motion

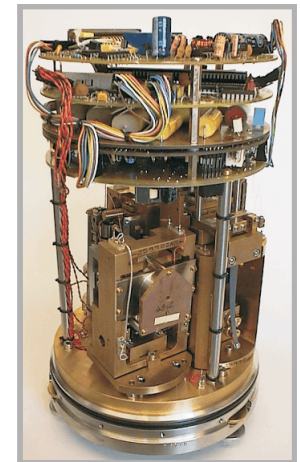
Wilhelm Bialowons · Deutsches Elektronen-Synchrotron DESY · Hamburg

June 22, 2005

CMG-3TD



CMG-3TD



One channel of a velocity broadband seismometer feedback circuit.



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Group members

R. Amirikas, W. Bialowons, H. Ehrlichmann and N. N. from DESY
T. Bierer and J. Grabe from TUHH

Tasks in 2005 and 2006

MEASURE: Vibration measurement techniques for active stabilisation tests.

MODEL: Theoretical investigation of ground vibration and cultural noise.

MODUL: Investigation of the vibration of a superconducting accelerating module.

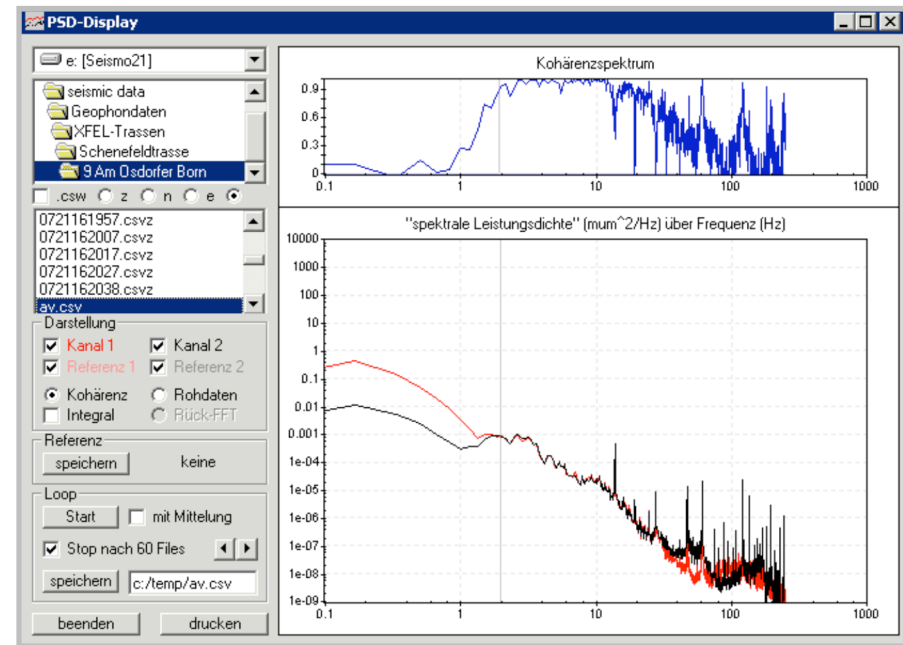
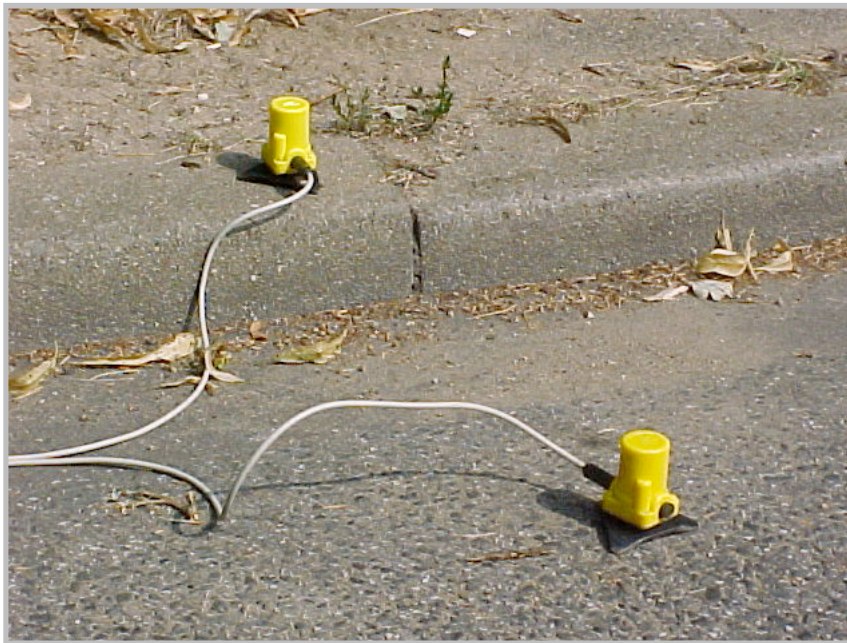
SEISMO: Investigation of seismic sensor performance in the fringe field of a detector and at 2 K inside of a cryostat.

SURVEY: Survey of the ground vibration at potential Linear Collider sites.

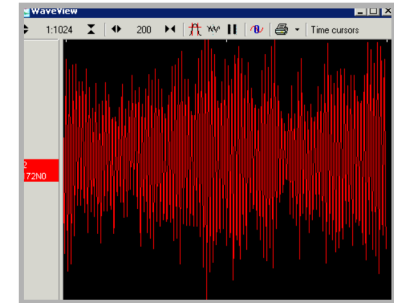
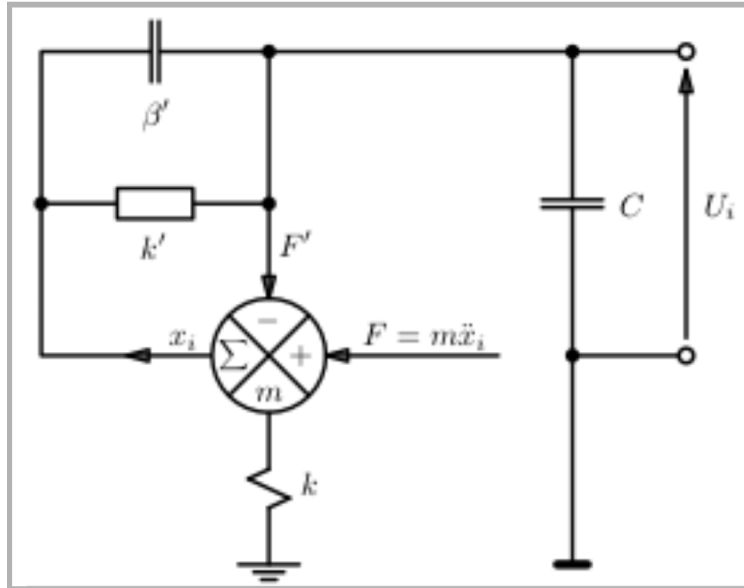
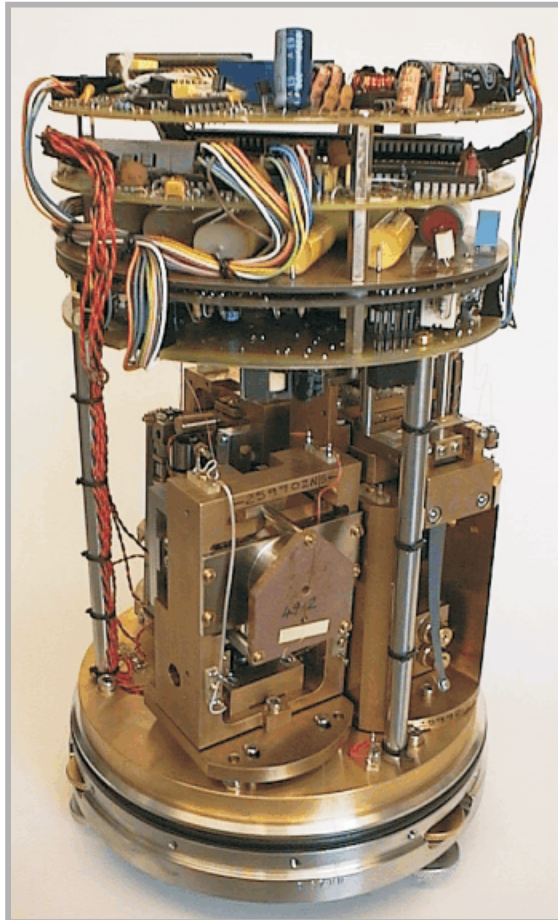
EUROTeV WP7 Metrology and stabilisation: Ground motion tasks in 2005 and 2006.



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Vertical ground vibration measurements with SM-6 geophones from Sensor Netherland and an amplifier from Kebe Hamburg.



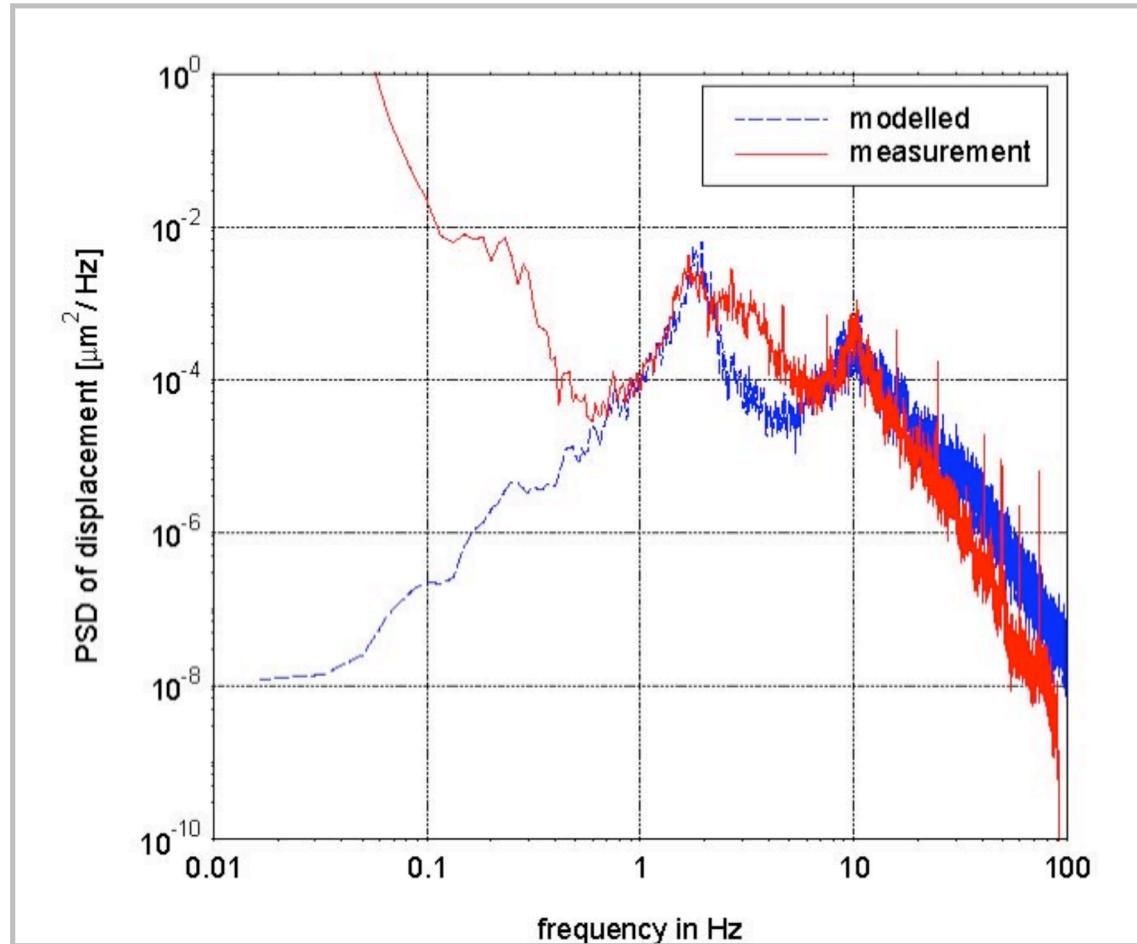
The Guralp triaxial feedback seismic sensor CMG-3T measures the ground acceleration which is integrated internally. The Figure shows the principle layout of one axis of a velocity broadband seismometer.

The vertical inertial mass and the inverted horizontal pendulum (m) are both supported with leaf springs with the constant k . The position is measured capacitively. A feedback loop with a force transducer compensates the ground acceleration acting on the seismic mass. The resonance frequency of the mass spring system can be significantly reduced by the proper choice of the proportional constant k' of the feedback loop. The feedback current is proportional to the ground acceleration. The voltage across the capacitor C is a time integral of the current, and thus proportional to the ground velocity. This voltage serves as output signal shown in the screen shot.

Seismometer CMG-3TD: One channel of a velocity broadband seismometer feedback circuit.



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Modelling of cultural noise: Traffic seems to be the main reason for “Cultural Noise”.



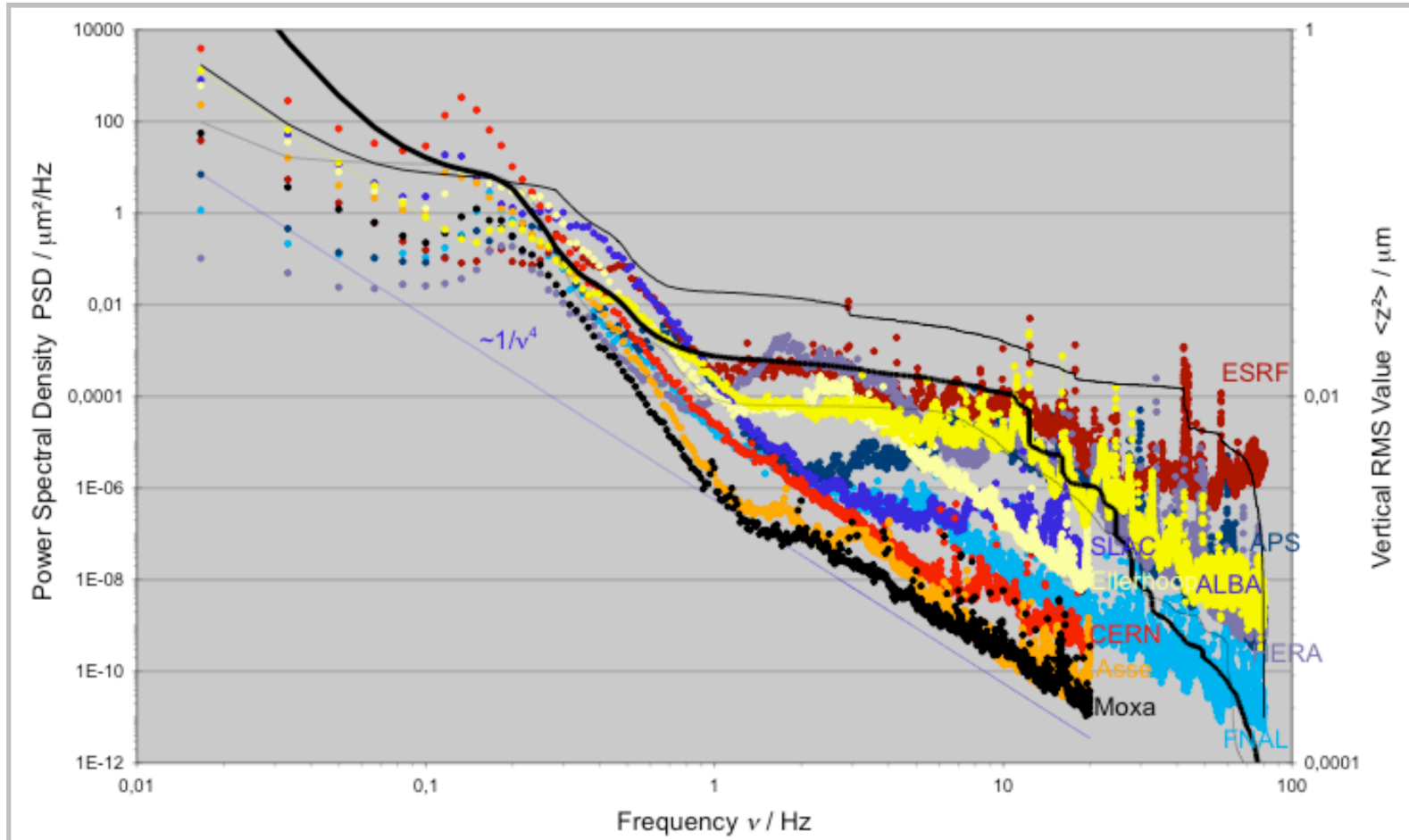
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Vibration measurements at a TESLA superconducting accelerating module inside TTF.



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Site comparison for ILC: Power spectral density and RMS values.