SWG Research report

March 23, 2005 LSC Meeting

G050214-00-R

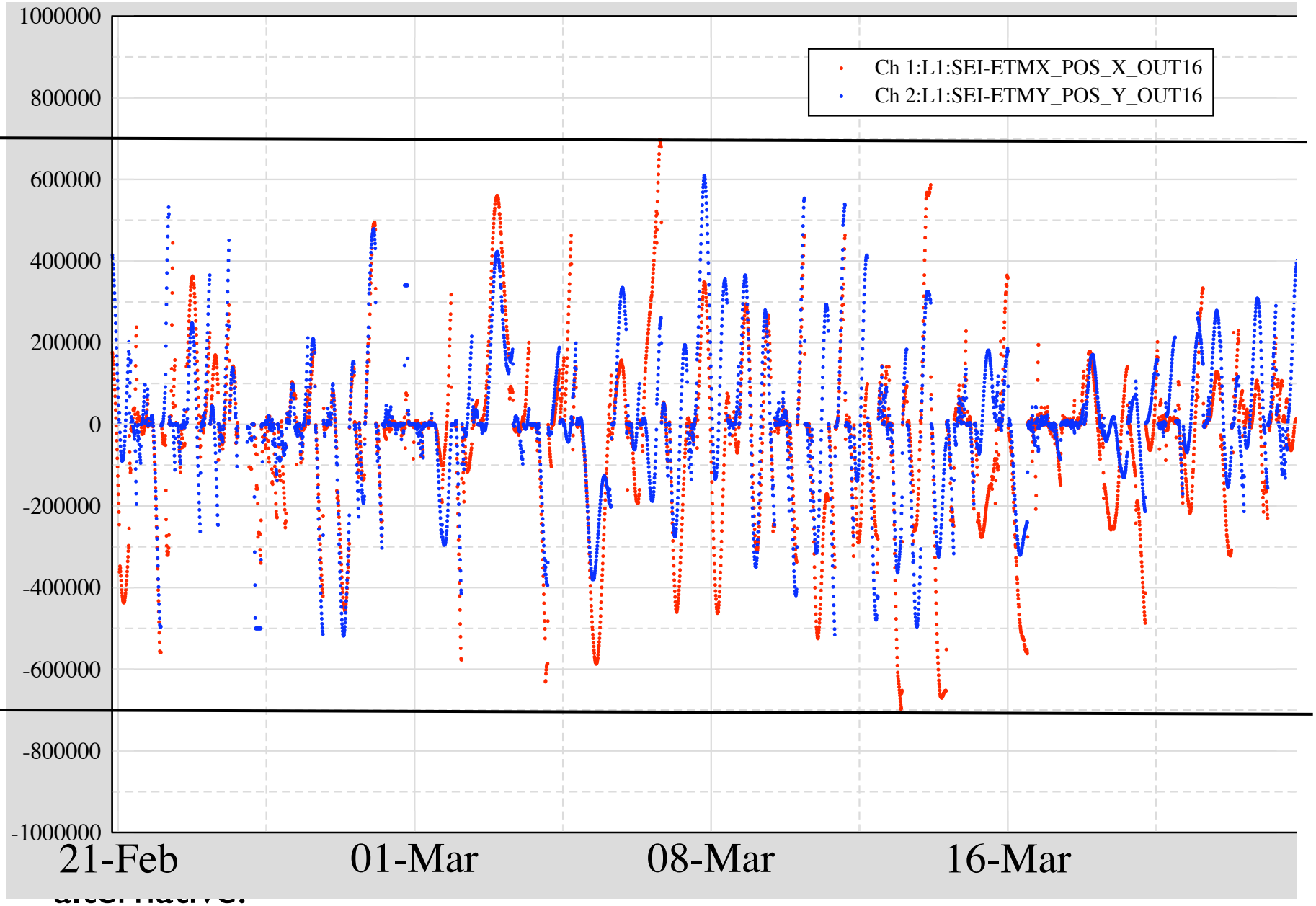
Suspensions R&D

- Calum Torrie, Progress towards the Adv LIGO end test mass suspension 'controls prototype' for testing at LASTI this summer.
  - mass versus structure frequency trade studies
  - eddy current damping of blade and rigid-body suspension modes
- Stuart Aston, Hybrid OSEM development progress report. Tim Haylor, FE Modeling of ETM Structure.
- Caroline Cantley, Fiber & Ribbon pulling using CO_2 laser, and automated pulling and metrology. welding techniques under development.

Seismic Isolation R&D

- Norna Robertson, model of seismic isolation of joint SEI/SUS system: Factor of 10 defect would result in our meeting 10 Hz requirement at 11.4 Hz.
- Brian Lantz, progress report from Adv LIGO seismic isolation platform tech. demonstrator at Stanford. First result: isolation factor at 1 Hz is close to requirement. (responding to highest priority of 'critical review' panel.)
- Shyang Wen, Performance/ configuration of HEPI for S4. 99+% HEPI uptime, 75% L1 Science mode. Lots of room for improvement.
- Rich Mittleman, isolation development at LASTI.
  - HEPI geophone tilt correction.
  - adaptive filters, active modal estimators
- Riccardo DeSalvo, passive attenuation design for HAM. SAS-based design under exploration for OMC and/or as Adv LIGO design alternative.

Seismic Isolation R&D



Thermal / Excess noise R&D

- Valery Mitrofanov, Cold damping of fused silica violin modes, non-stationary electrical charge distribution on fused silica pendulum, and mechanical *Q* factor.
  - design of fiber mode damper using electrostatic coupling to circuit.
  - evidence for slow decay of silica mass charge, and varying pendulum *Q* with it.
- Igor Bilenko, Thermal & non-thermal noise in silica fiber.
  - results from delicate experiment comparing displacement of stretched fiber with expected thermal distribution. No excess seen with 0.01 kT (0.1 s) resolution.
- Sheila Rowan, Cryogenic experiments exploring T-dependent thermal expansion coef and conductivity of Si. Goal is Si suspension design for future.