LIGO

LIGO Status

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Oversight Committee
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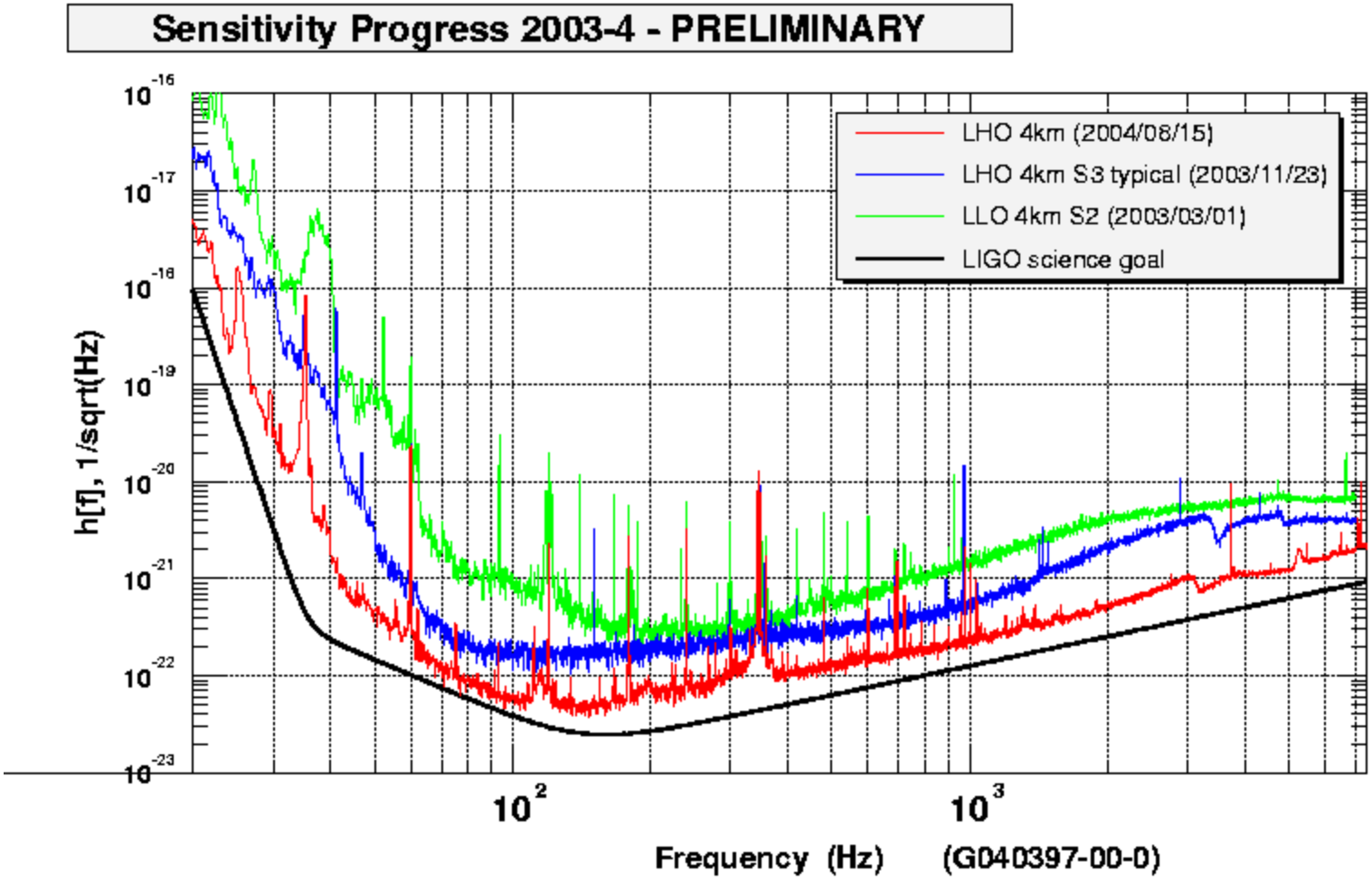
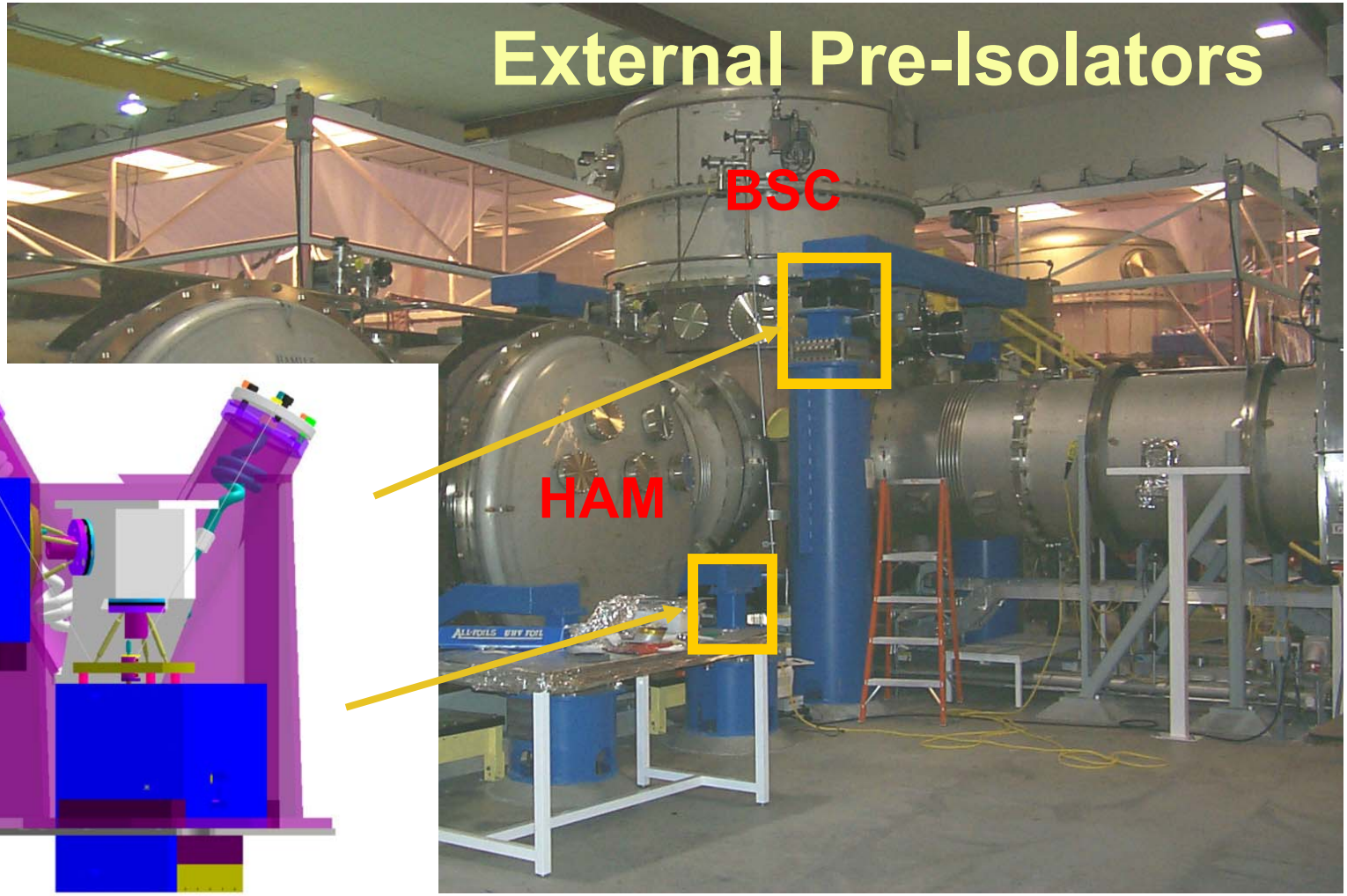
Summary Science Run Metrics

RUN⇒	S1		S2		S3	
IFO ⇓	*BNS RANGE (kpc)*	*DUTY FACTOR (%)*	*BNS RANGE (kpc)*	*DUTY FACTOR (%)*	*BNS RANGE (kpc)*	*DUTY FACTOR (%)*
L1	~150	43%	900	37%	800-1500	22%
H1	~30	59%	350	74%	1500-5000	69%
H2	~40	73%	200	58%	600-1100	63%
3-way		24%		22%		16%

Noise Improvements at LHO

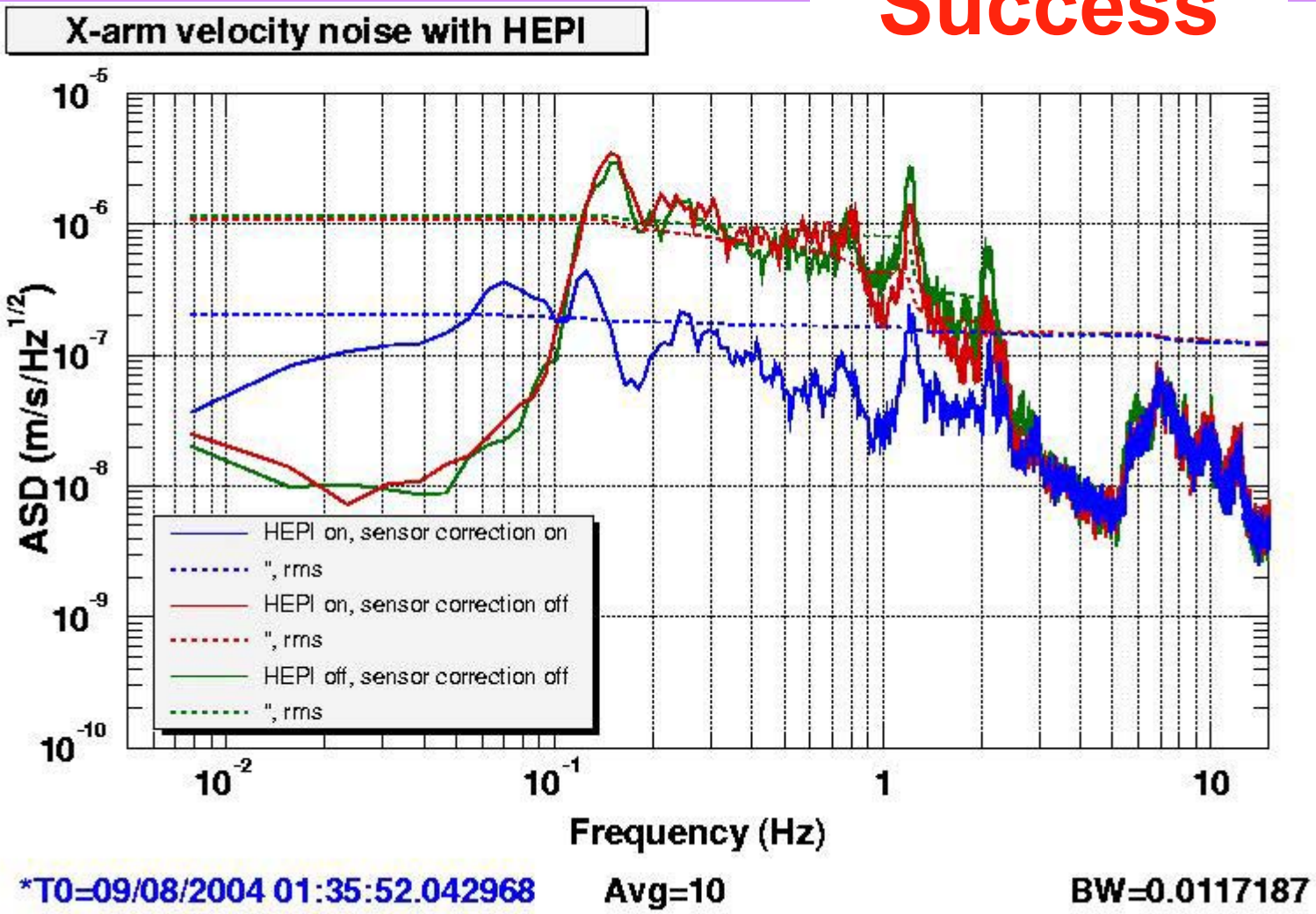


Seismic Remediation at LLO



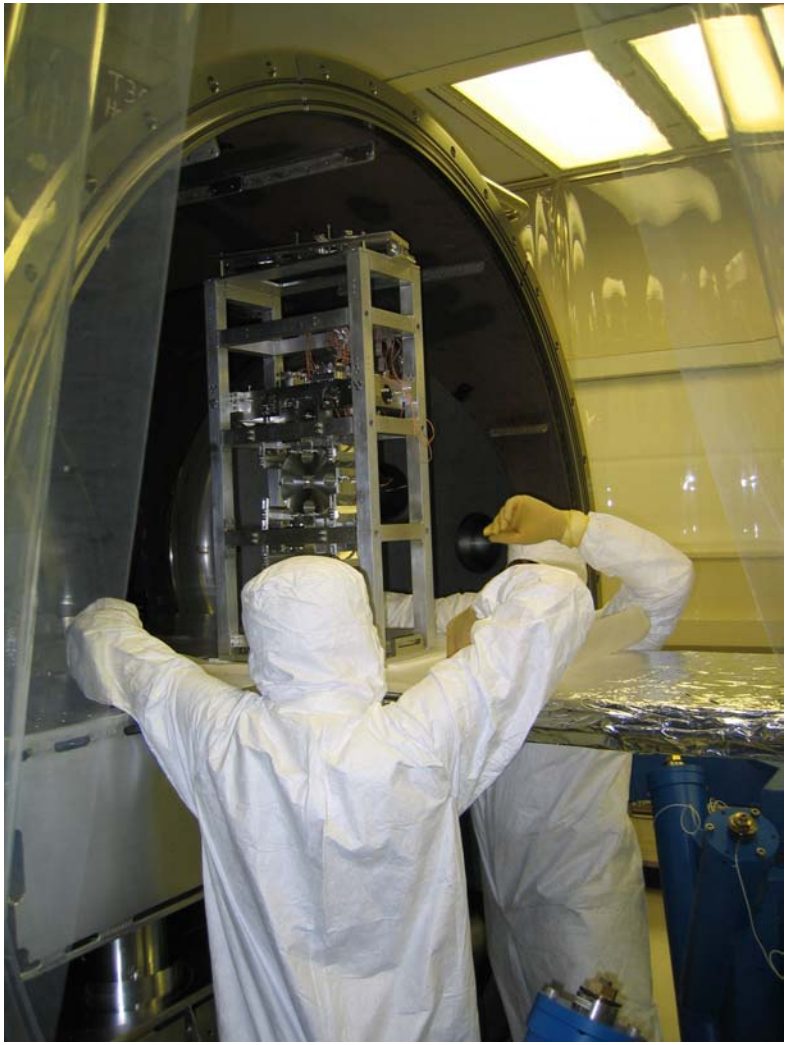
HEPI Performance—One Arm Test

Success



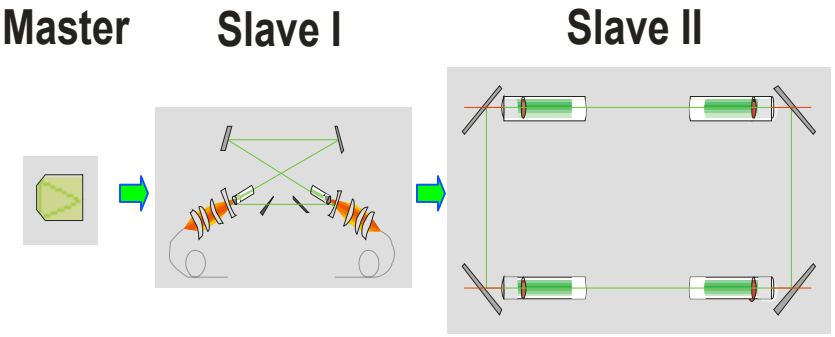
Advanced LIGO R&D Highlights

- Seismic Isolation
  - » Successful implementation of HEPI
  - » Further commissioning of platform at Stanford
- Suspensions
  - » Installation of Mode Cleaner triple suspension at LASTI
- ISC/40m
  - » Completed installation, locked lots of bits
  - » Found problem with locking scheme (sidebands on sidebands)….probably found solution (Mach-Zehnder)



Advanced LIGO R&D Highlights

- Pre-stabilized laser
  - » Power Stage injection locked
  - » 170 W, single frequency laser!



- Coatings
  - » Reductions in absorption with increasing dopant in Titania (LMA)
  - » Need another factor 2-3 reduction…

- Auxiliary Optics/Thermal compensation
  - » Successful application to initial LIGO
  - » Analysis includes inhomogeneity of coating absorption – important for substrate selection

AdvLIGO Status as a Project

- Advanced LIGO proposal submitted in early 2003 and was reviewed in June 2003
  - Reviews very favorable
- NSB discussion/approval Oct 14, 2004
- Earliest MREF funding start FY 2007 (Oct 2006)
  - Depends critically on future funding levels for NSF
- Developing detailed project management data (cost, schedule, technical work packages)
  - Advanced LIGO organization interacts with up-coming Lab operations renewal, evolving relation between Lab and LSC

LIGO Outreach Activities

- New outreach coordinators at both observatories
  - » Dale Ingram at LHO
  - » John Thacker at LLO

School Group Tour at LLO

National Astronomy Day at LHO

LIGO Outreach Collaboration

- Newly funded collaborative effort focused on Louisiana
  - » LIGO provides scientific motivation and constructs/operates visitor center
  - » Exploratorium provides hands-on exhibits, experience with interactive learning, teacher workshops
  - » Southern University brings LIGO science to science education, training for pre-service teachers
  - » Louisiana Board of Regents extends our program through public education, provides links to schools and teachers

Plan for S4

- Goal to have more flexibility to react to conditions as we approach and initiate the run
- Peter Fritschel chairs run planning committee
  - » Representatives from commissioning, GEO, LSC, Lab, …
  - » Recommends timing, duration, goals for run
  - » Ability to delay or modify run if conditions warrant
- Tentative plan
  - » S4 to be held starting in early 2005, ~ 4 weeks duration
  - » Engineering run(s) approximately 1 month in advance
  - » Sensitivity goals: H1 7.5 Mpc, L1 4Mpc, H2, 2 Mpc
  - » Duty cycle goal: All Individuals 70%, triple 40%
  - » "Science content" ~ 5-10 times S3
- ~6 month commissioning interval, followed by long S5 (latter half of 2005)