

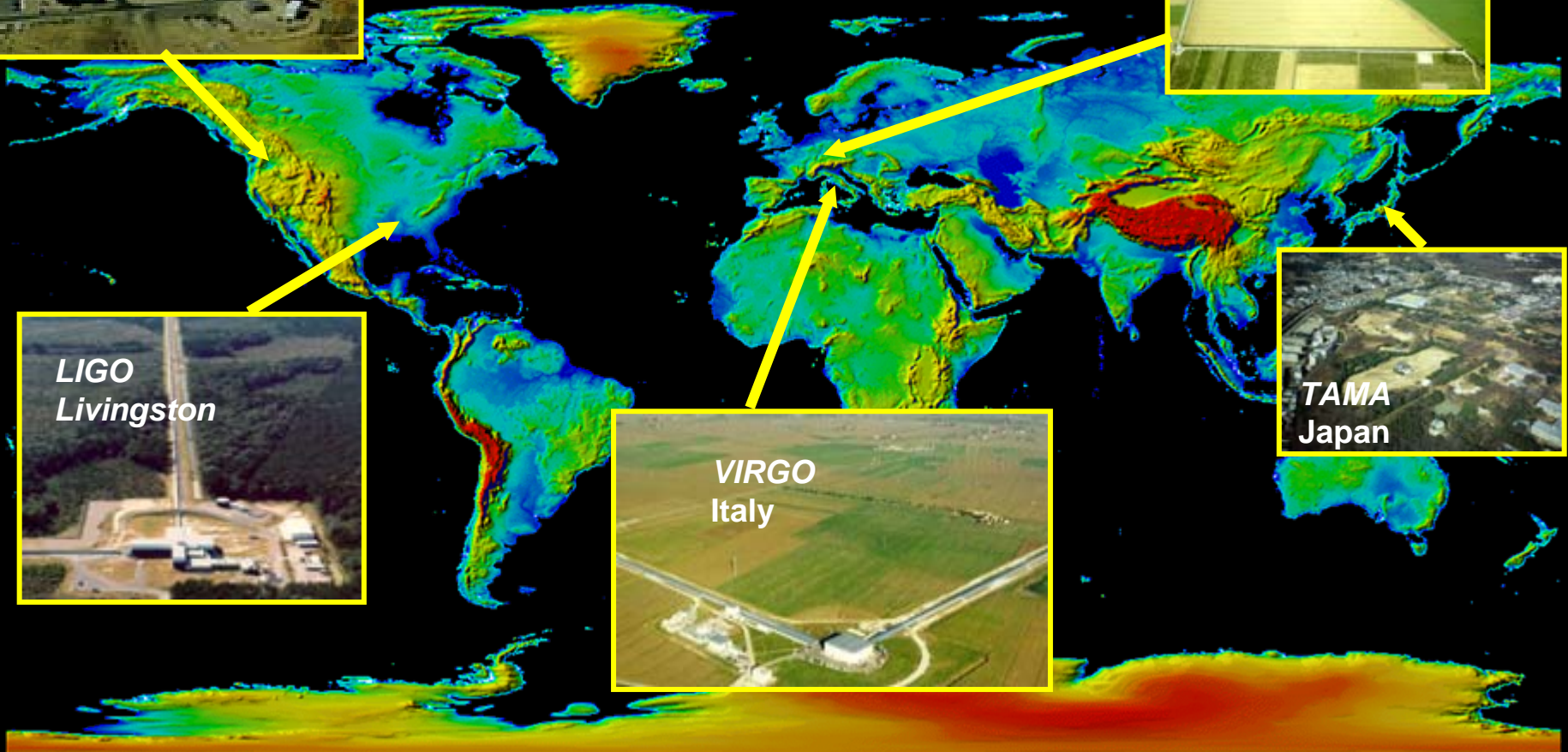


Roadmap to the Enhanced and Advanced LIGO Detectors

Joshua Smith

**Syracuse University
Department of Physics
For the LIGO Science Collaboration**

The Global Network of Gravitational Wave Detectors



LIGO sites

Hanford

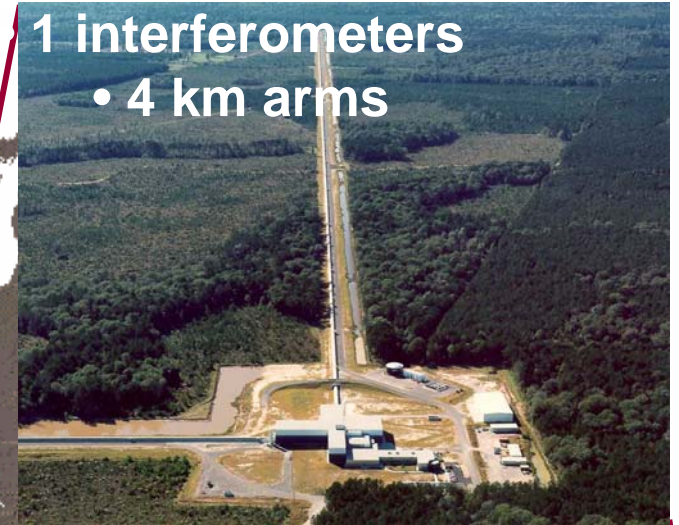
- 2 interferometers
- 4 km, 2 km arms



LIGO Hanford Observatory

LIGO Livingston Observatory

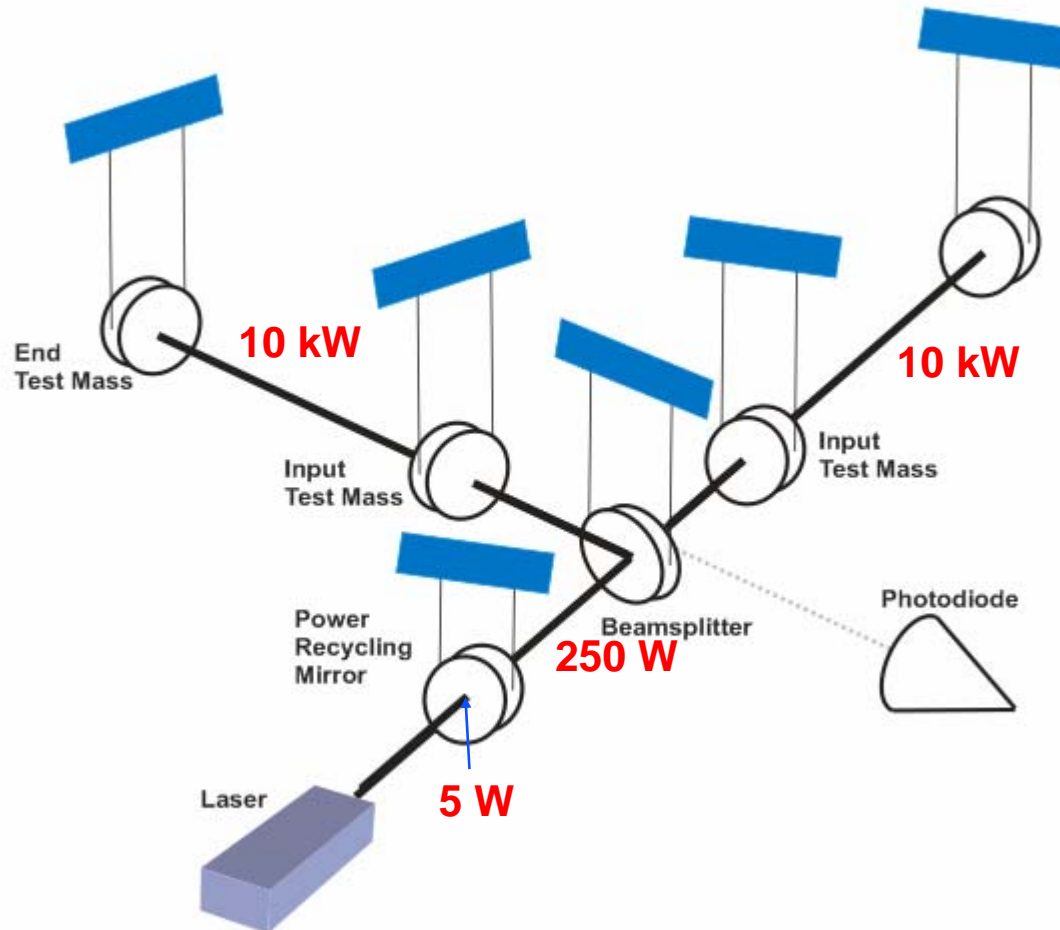
- 1 interferometers
- 4 km arms

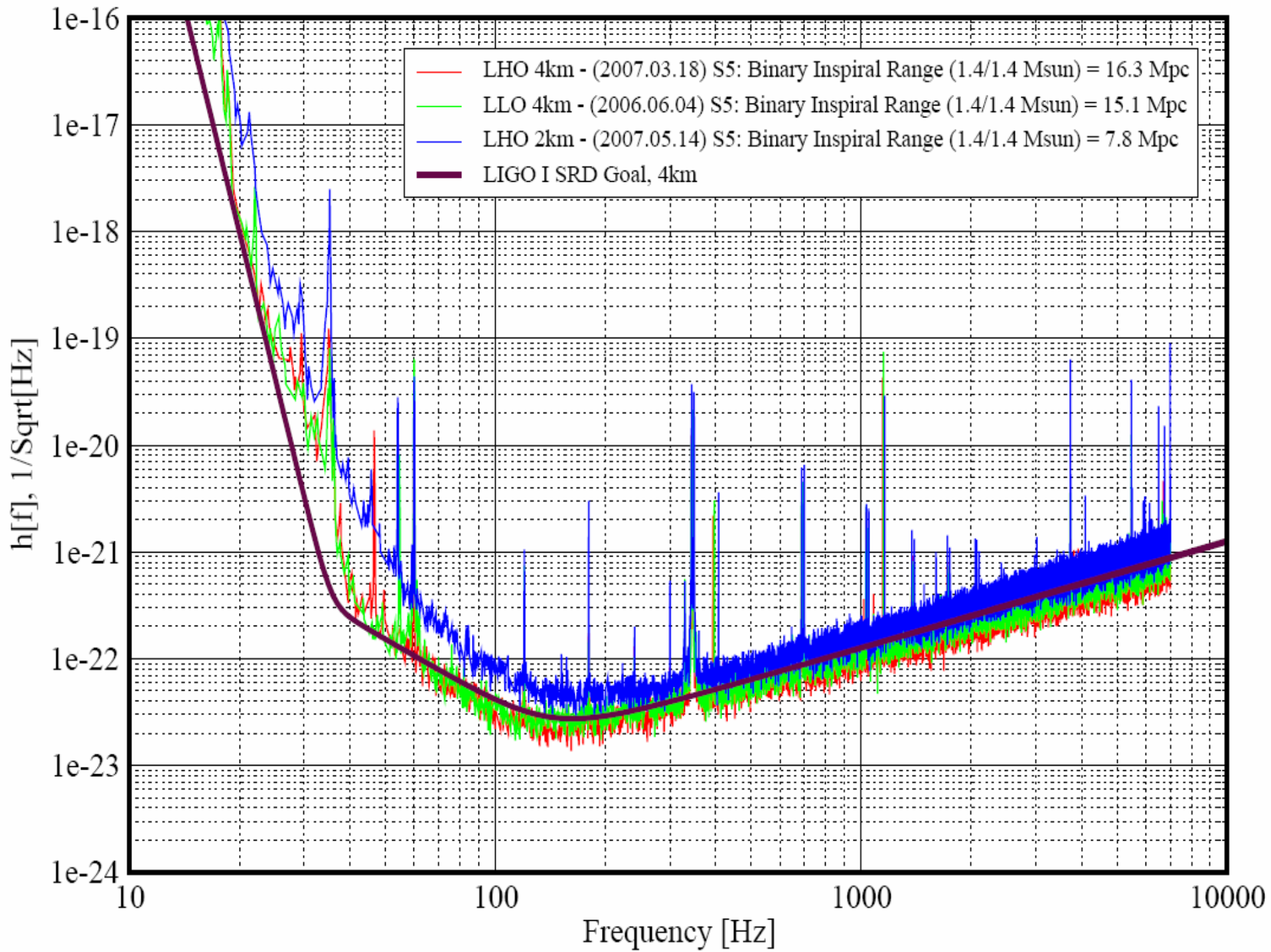


Livingston

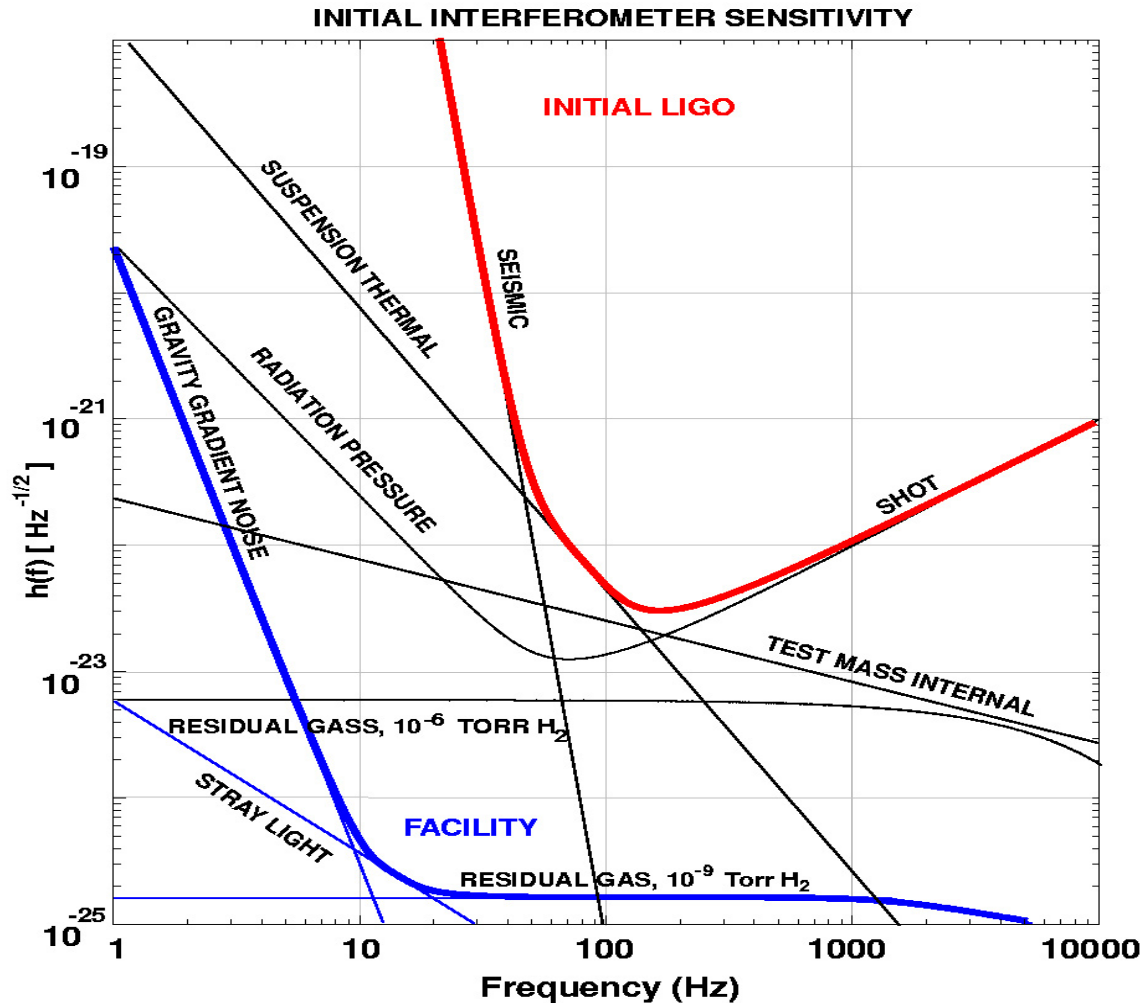
LIGO Observatories are operated by Caltech and MIT, LIGO Science done by LIGO Scientific Collaboration.

Initial LIGO Configuration





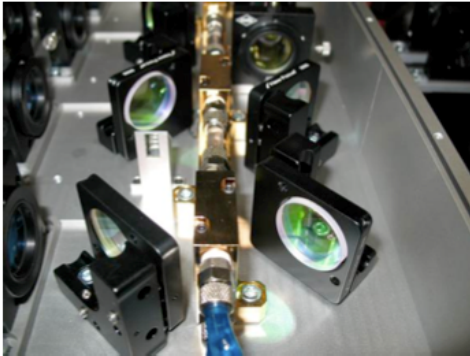
Fundamental Noises in LIGO



LIGO Enhancements

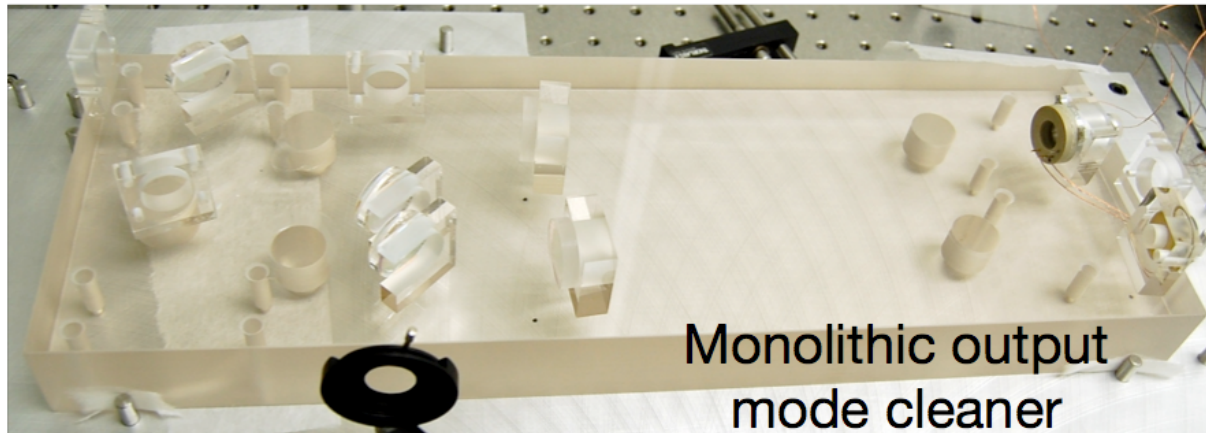
LIGO

35 W
Lazer
Zentrum
Hannover
PSL



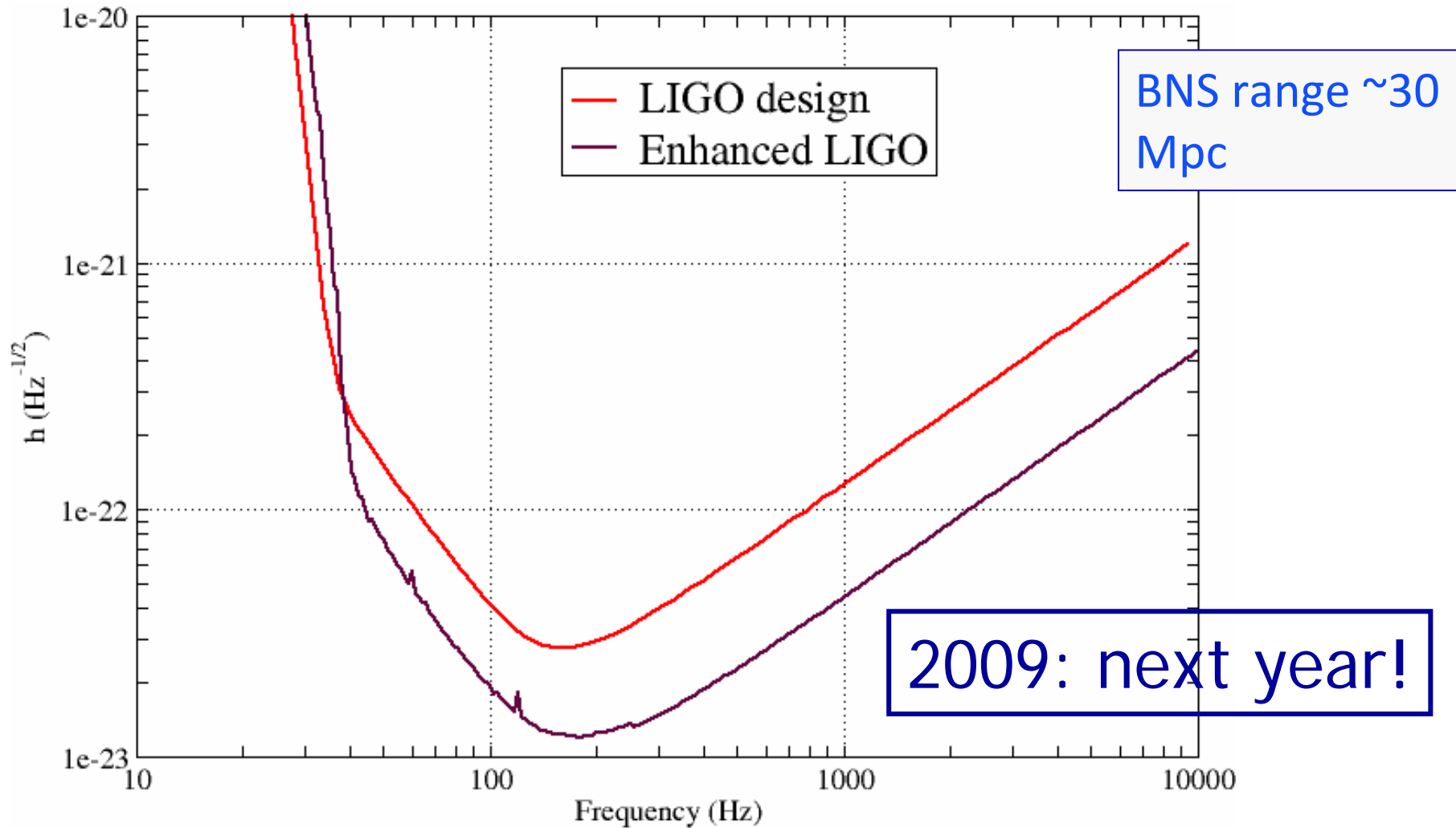
λ Enhanced LIGO Commissioning underway, S6 in early 2009

- » 35W LZH Laser
- » DC Readout with OMC
- » HAM Internal Seismic Isolation (ISI)
- » Thermal Compensation Upgrades
- » Higher quality magnets
- » ...

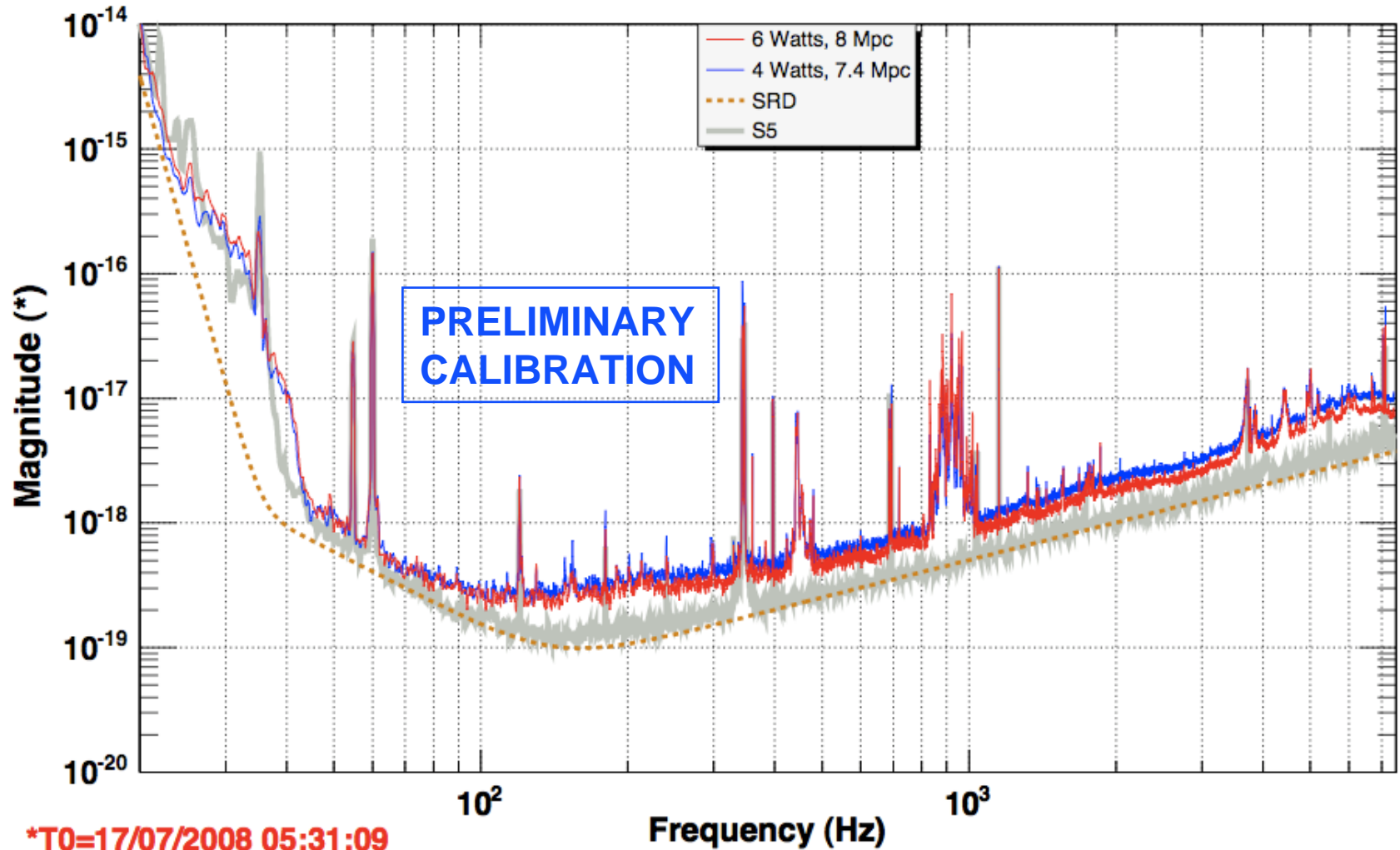


Monolithic output mode cleaner

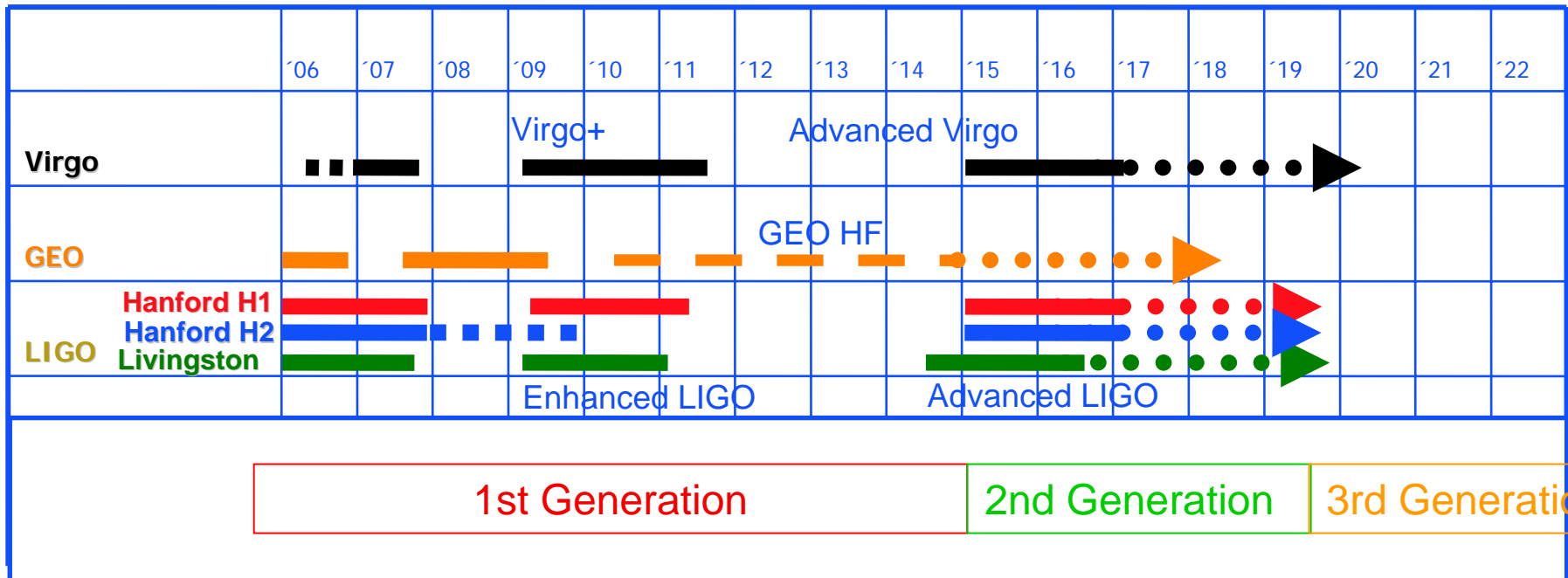
Enhanced LIGO



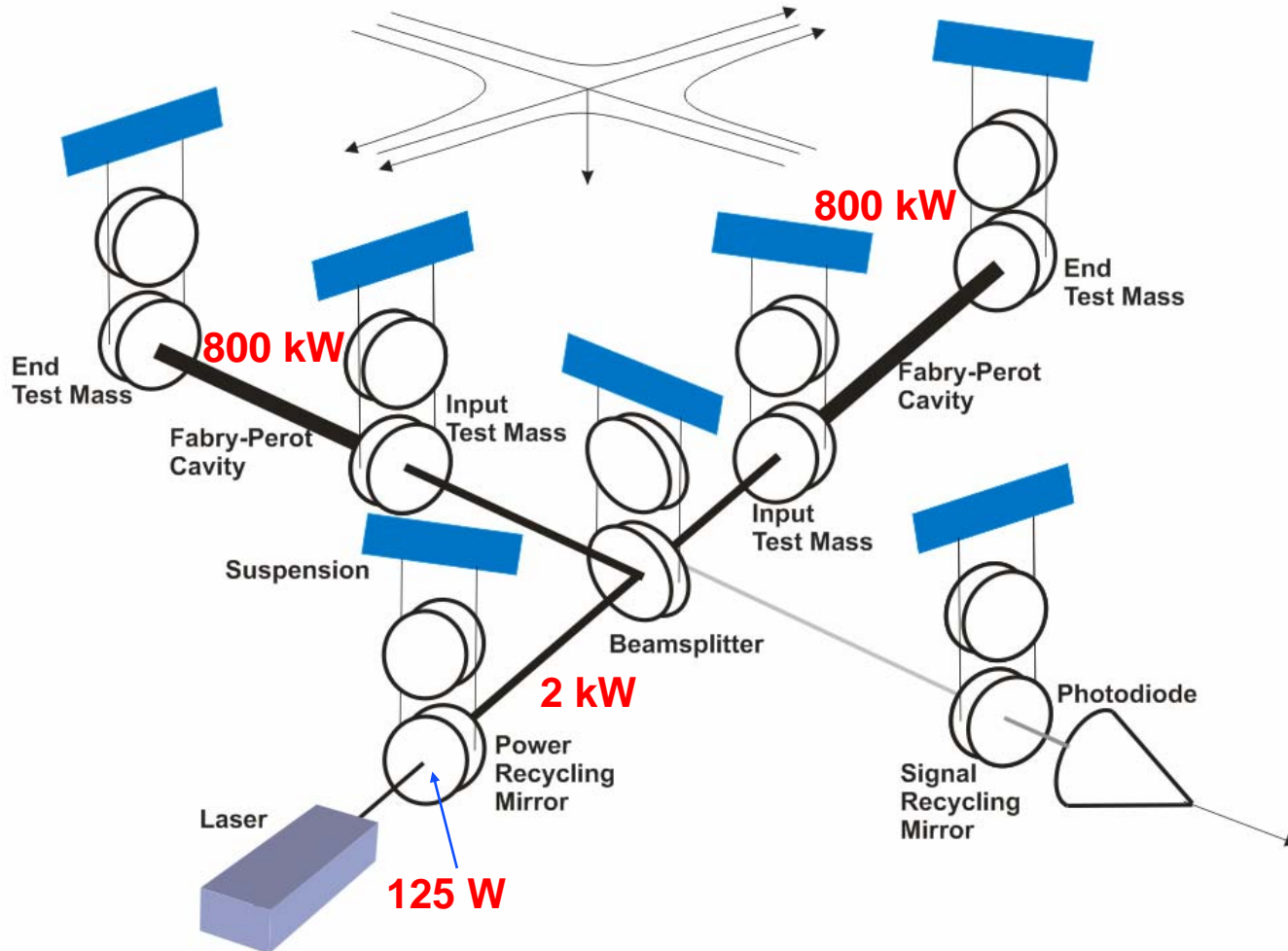
DC Readout Commissioning



You are here

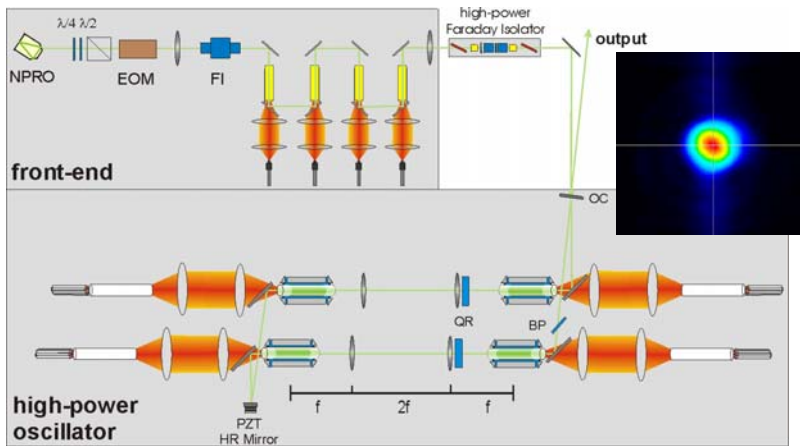



Advanced LIGO Configuration



Advanced LIGO

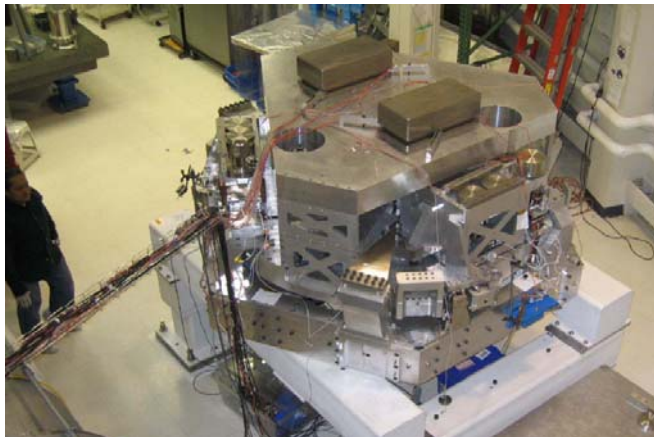
180 W laser



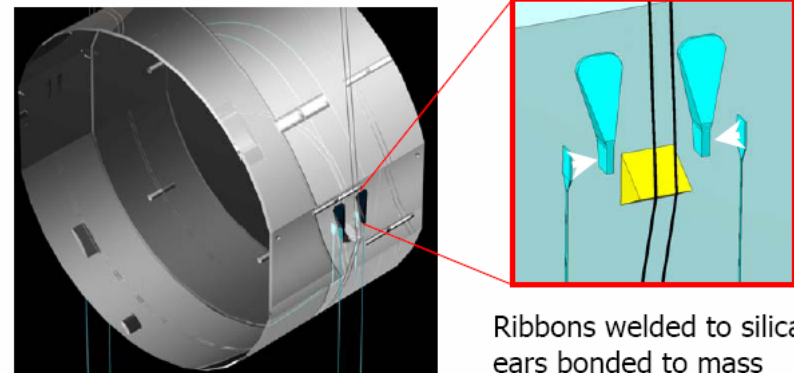
Mirror Suspensions



Seismic isolation

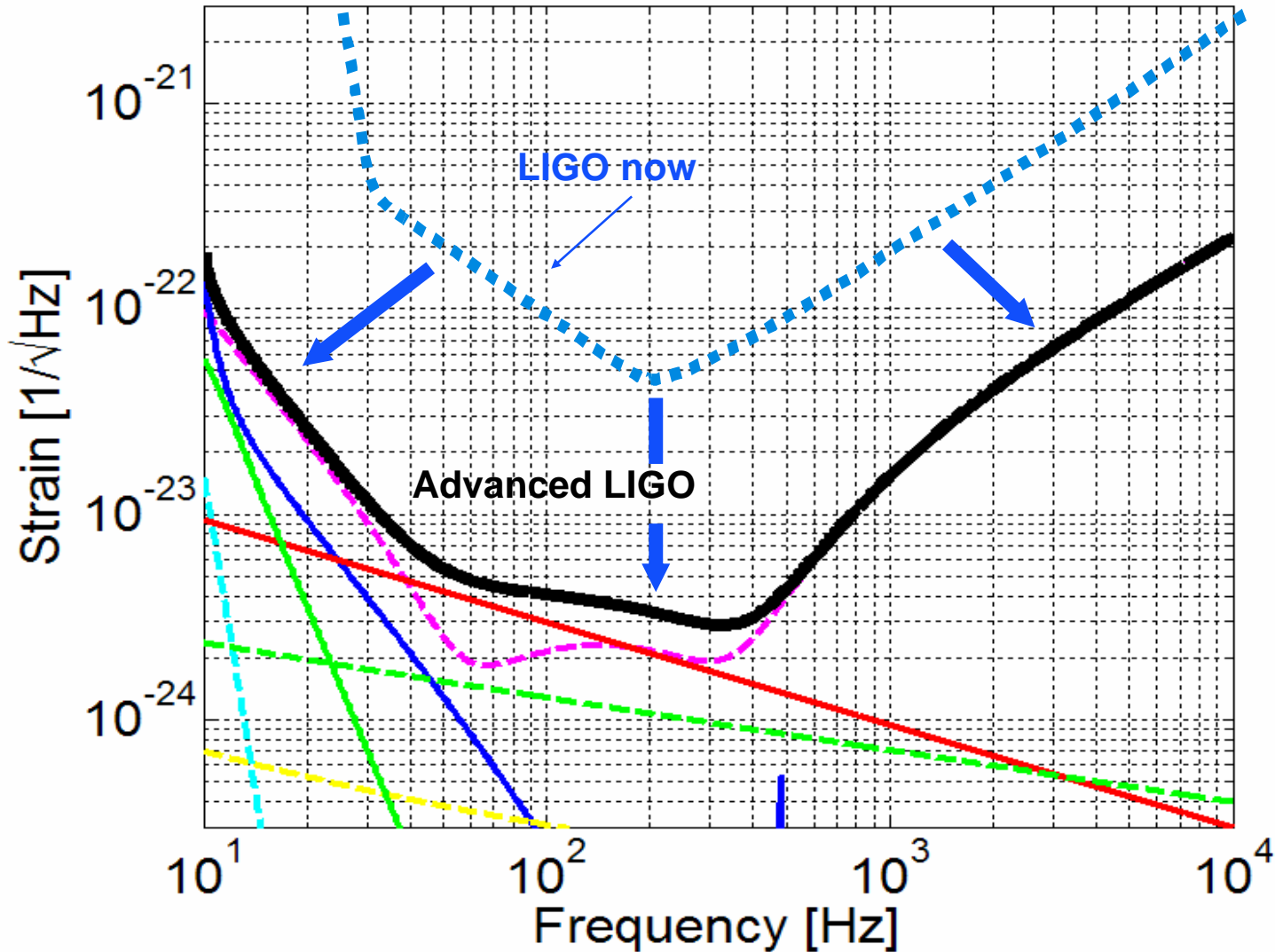


Mirrors

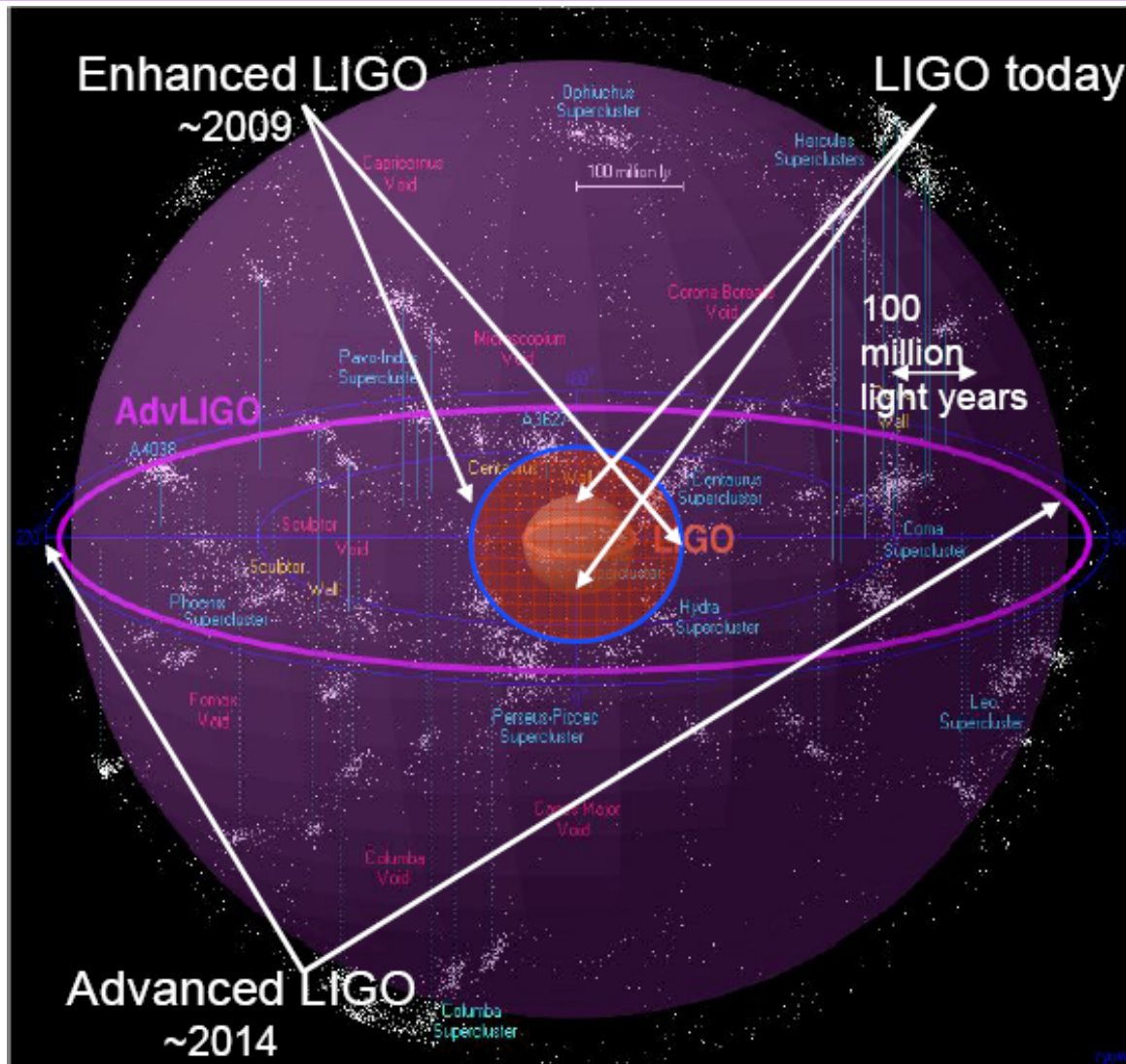


Ribbons welded to silica ears bonded to mass

Initial and Advanced LIGO



Astronomical Reach



Acknowledgments

- Members of the LIGO Laboratory 
- Members of the LIGO Science Collaboration 
- National Science Foundation 

More Information

- <http://www.ligo.caltech.edu>; www.ligo.org

LIGO

LIGO Scientific Collaboration



UNIVERSITY OF STRATHCLYDE



SOUTHERN UNIVERSITY
Agricultural & Mechanical College



San José State UNIVERSITY



UNIVERSITY of WISCONSIN
UWMILWAUKEE



UNIVERSITY OF ROCHESTER

NAOJ



Science & Technology Facilities Council
Rutherford Appleton Laboratory



Andrews University



THE UNIVERSITY OF WESTERN AUSTRALIA



PENN STATE



Universitat de les Illes Balears

WASHINGTON STATE UNIVERSITY

University of Southampton



UNIVERSITY OF MINNESOTA

CHARLES STURT UNIVERSITY

Universität Hannover

UNIVERSITY of FLORIDA