

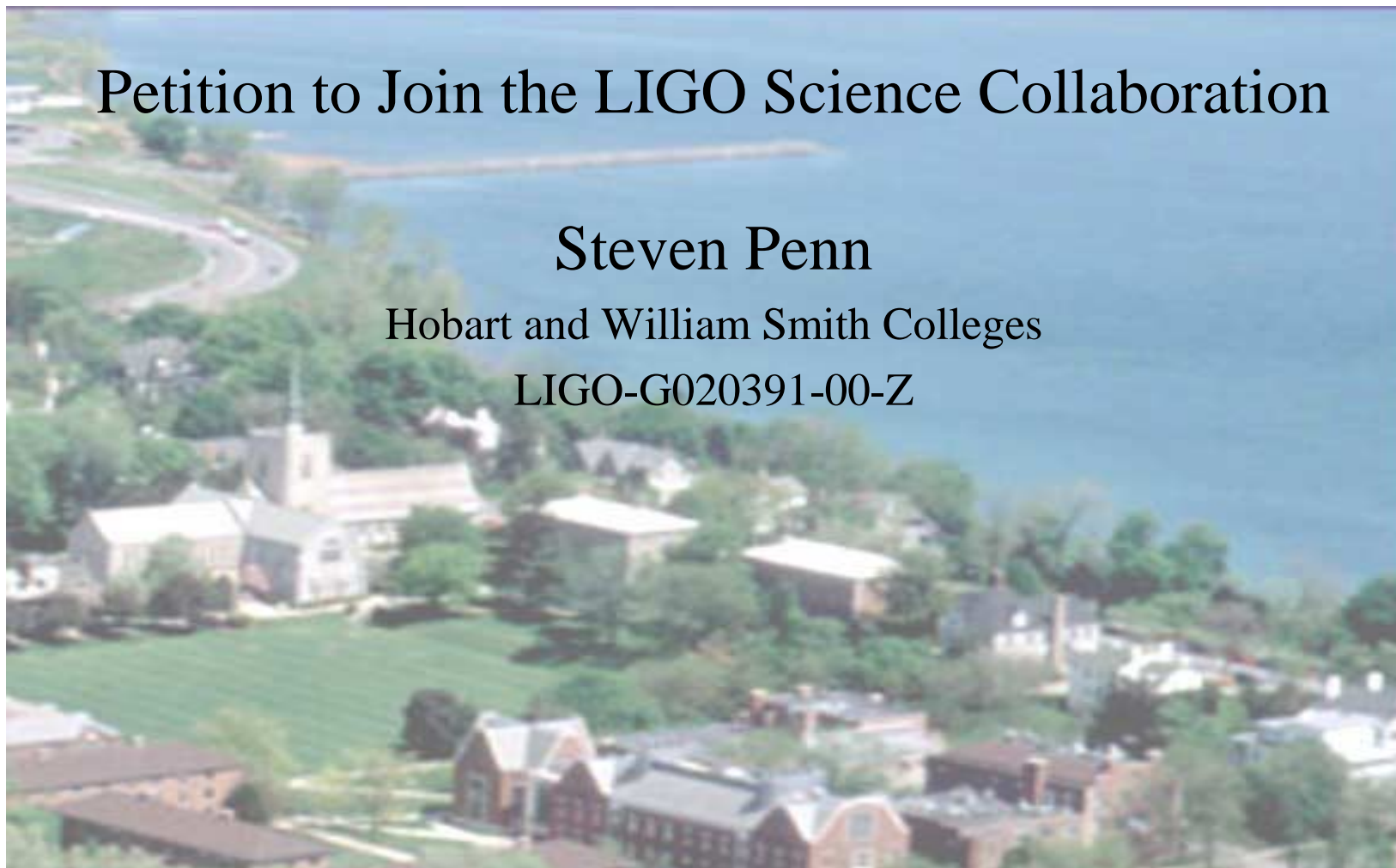


Petition to Join the LIGO Science Collaboration

Steven Penn

Hobart and William Smith Colleges

LIGO-G020391-00-Z





Basics of HWS:



- Hobart, founded 1820, and William Smith, founded 1908, are nominally independent, unisex schools, which have been merged as a single coeducational college for 60 years.
- 2,500 students. Strong focus on liberal arts, chemistry, and enviro. science.
- Located in Geneva, NY on Seneca Lake, largest of the Finger Lakes, and ancestral home of the Seneca Nation.
- Influence of nearby Seneca Falls. Elizabeth Blackwell, the first woman in US to receive an MD, graduated from Geneva College.
- President's house was a major stop on the Underground Railroad.



Recent Events at HWS

New President Mark Gearan, head of Peace Corp during Clinton, has initiated a major campaign to reinvigorate the colleges.



- New Chemistry building
- New Library Wing
- New Sociology/Psychology building
- \$100 million raised to improve research and education facilities
- New “Finger Lakes Institute” planned
- New Physics building, larger dept. planned



Physics at HWS

- Small department: 5 faculty, 15 majors.
Don Spector (Harvard, particle theorist),
Ted Allen (Caltech, particle/string theorist),
Larry Campbell (Carnegie Mellon, nuclear/optics),
Michael Faux (Penn, string theorist), and
Steven Penn (MIT, nuclear/LIGO).
- Administration, campaign to strengthen sciences,
plans to increase faculty to 6 (2 new
experimenters), and new building.
- Physics, Chemistry, Biology, and Env. Science
jointly apply for new NSF grant to increase majors.



Support for LIGO group at HWS

- Start-up of \$100k and renovated lab space.
- Agreement to match all grants. No ceiling.
- No overhead.
- Full-time technician.
- Arrange classes to allow 1/2 time at SU.
- Encourage (partial support?) for a post-doc.



Thermal Noise Research

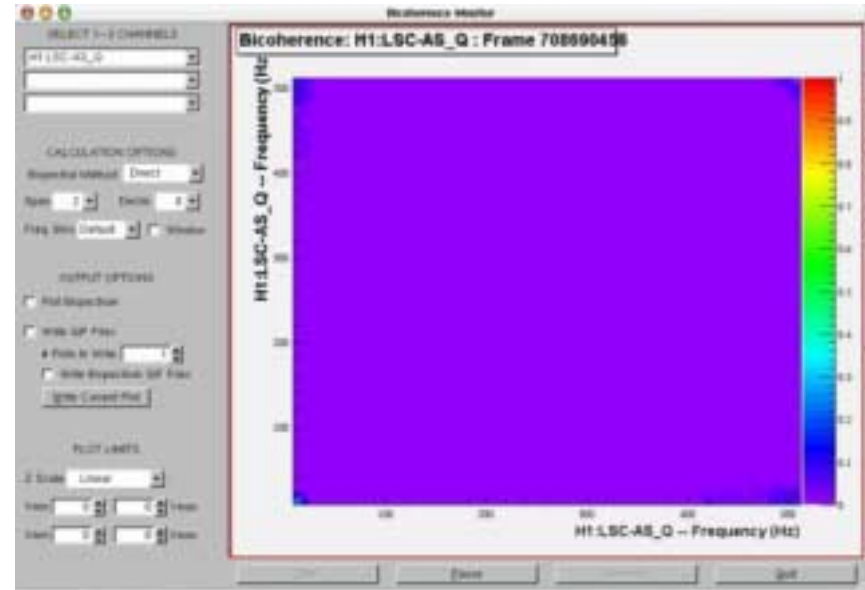
- Coating Loss: (Glasgow, MIT, Stanford, Syracuse)
 - Shown that coating loss due to bulk loss, mostly tantala
 - Future tests:
 - Other materials (Niobia/Silica, Alumina/Silica, ...)
 - Varied Methods: Doping tantala, optimized annealing
- Silica Surface Loss and Annealing
 - Q vs. V/S has reached $Q = 84$ million for $V/S > 2$ mm
 - Future tests:
 - Annealing
 - other FS varieties, esp. Supersil SV super-low OH
- Investigate thermal noise issues in Sapphire
- Continued collaboration with SU group



Detector Characterization Research

Bilinear Coupling Investigation

- BicoMon: a data monitor which calculates the bicoherence & bispectrum. Used to detect bilinear processes, quadratic phase coupling, frequency/phase noise.



- Future directions: to expand BicoMon into a more complete of suite of second-order statistics tool, including gaussianity & linearity tests and bicepstrum.



Summary

- Continued program of LIGO research on coating loss, thermal noise for Advanced LIGO, and detector characterization.
- HWS is being very supportive in funds and facilities.
- HWS location allows continuation of valuable collaborative work with Syracuse.