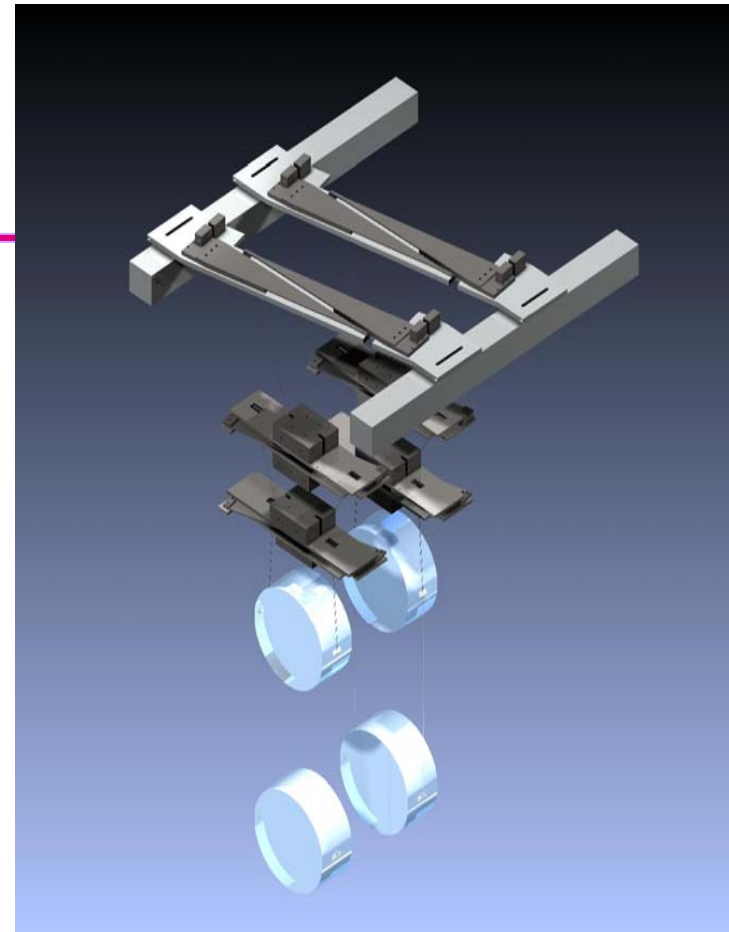




The Next Generation: Advanced LIGO

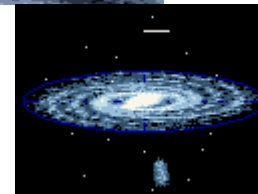
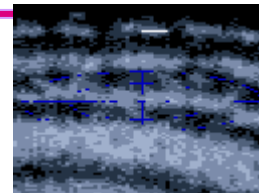


Stan Whitcomb
Congressman Hastings Visit
LIGO Hanford Observatory
4 February 2005



Progress toward our Science Goal— Distance LIGO can detect Binary Neutron Stars

- First data analyzed Dec 2001
 - » Local stellar neighborhood
- First Science Run August 2002
 - » Entire Milky Way Galaxy
- Second Science Run Feb-April 2003
 - » First large external galaxy
- Third Science Run Nov-Dec 2003
 - » Numerous external galaxies



Milky Way



M31



M81

- 2005 (?)
Design
Sensitivity



Virgo cluster

What is next?

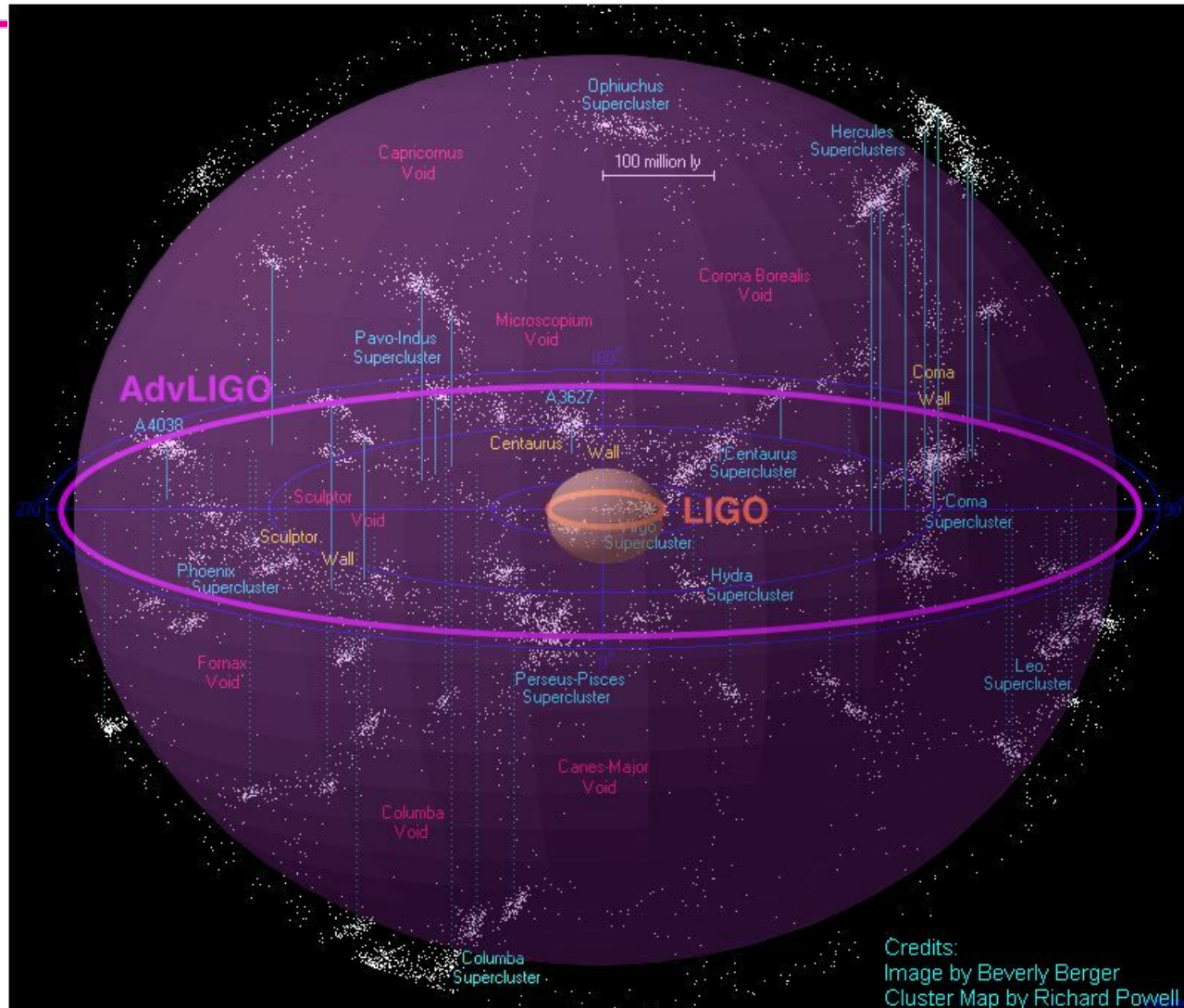


Technology Improvements Enable Improved Sensitivity

- Higher power laser
 - » Power increased from 10W to 200W
 - » Greater stability
- Vibration isolation
 - » Passive system replaced by higher performance active one (senses ground vibrations and compensates for them)
- Mirrors improved
 - » Larger; better coatings; more accurate polishing
- Suspension system for mirrors improved
 - » Steel suspension wires replaced by glass fibers
- Better electronics, faster computers, etc.
- Potential for spin-offs



Increased "Reach" for Advanced LIGO





AdvLIGO Chronology Status

- 1998: Advanced LIGO concept developed
 - » R&D carried out by LIGO Lab and collaborators
- 2003: Proposal to NSF for fabrication, installation
- 2004: NSB approves AdvLIGO for FY07 start
 - » \$185 M from NSF, \$12-20 M from foreign partners
- 2007: First funding available (hopefully!)
 - » Fabrication begins in parallel with continued LIGO operation
- 2010: Start initial decommissioning/installation
 - » Staggered installation, Livingston and then Hanford
- 2013: Coincident observations with AdvLIGO