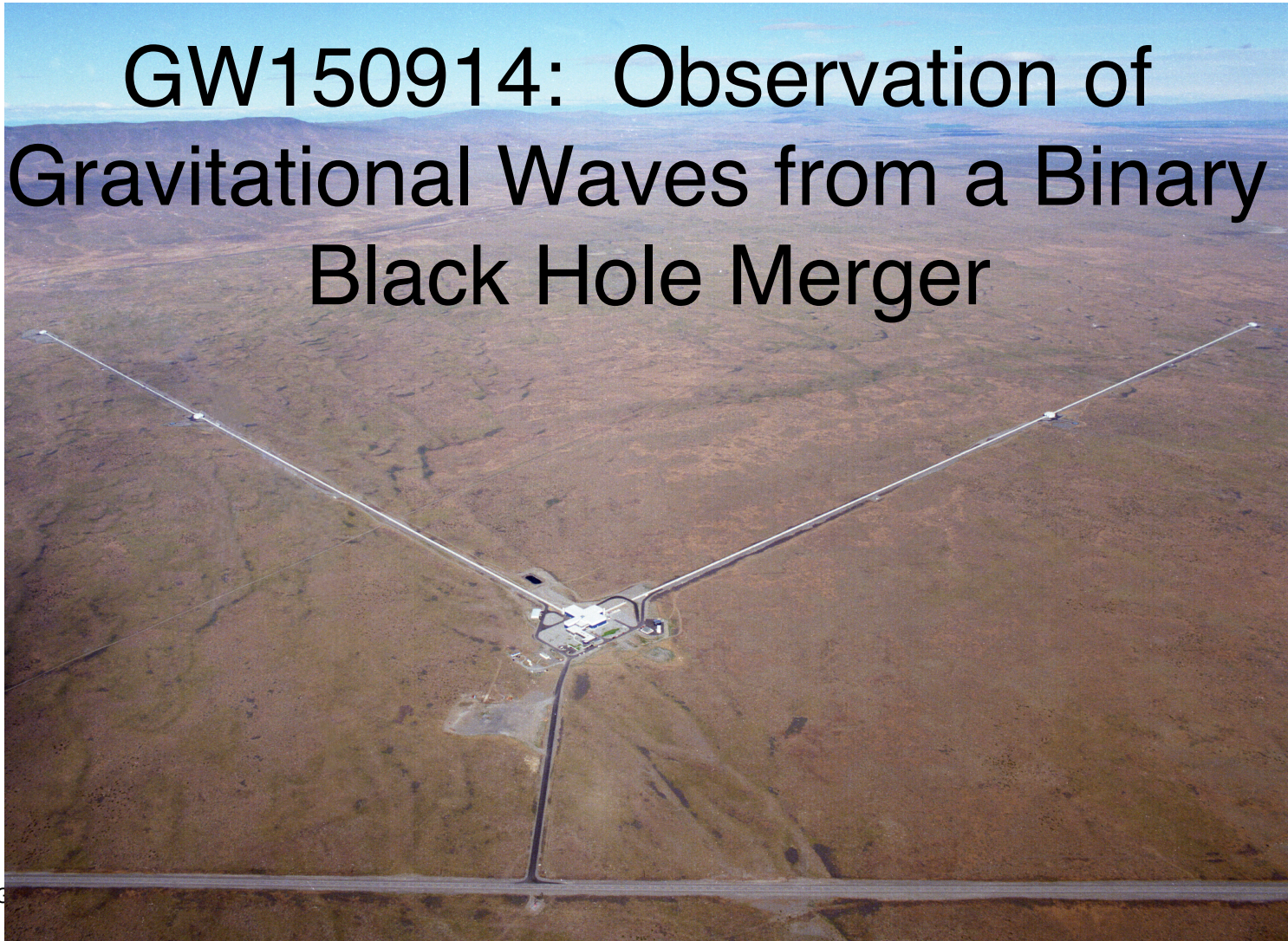


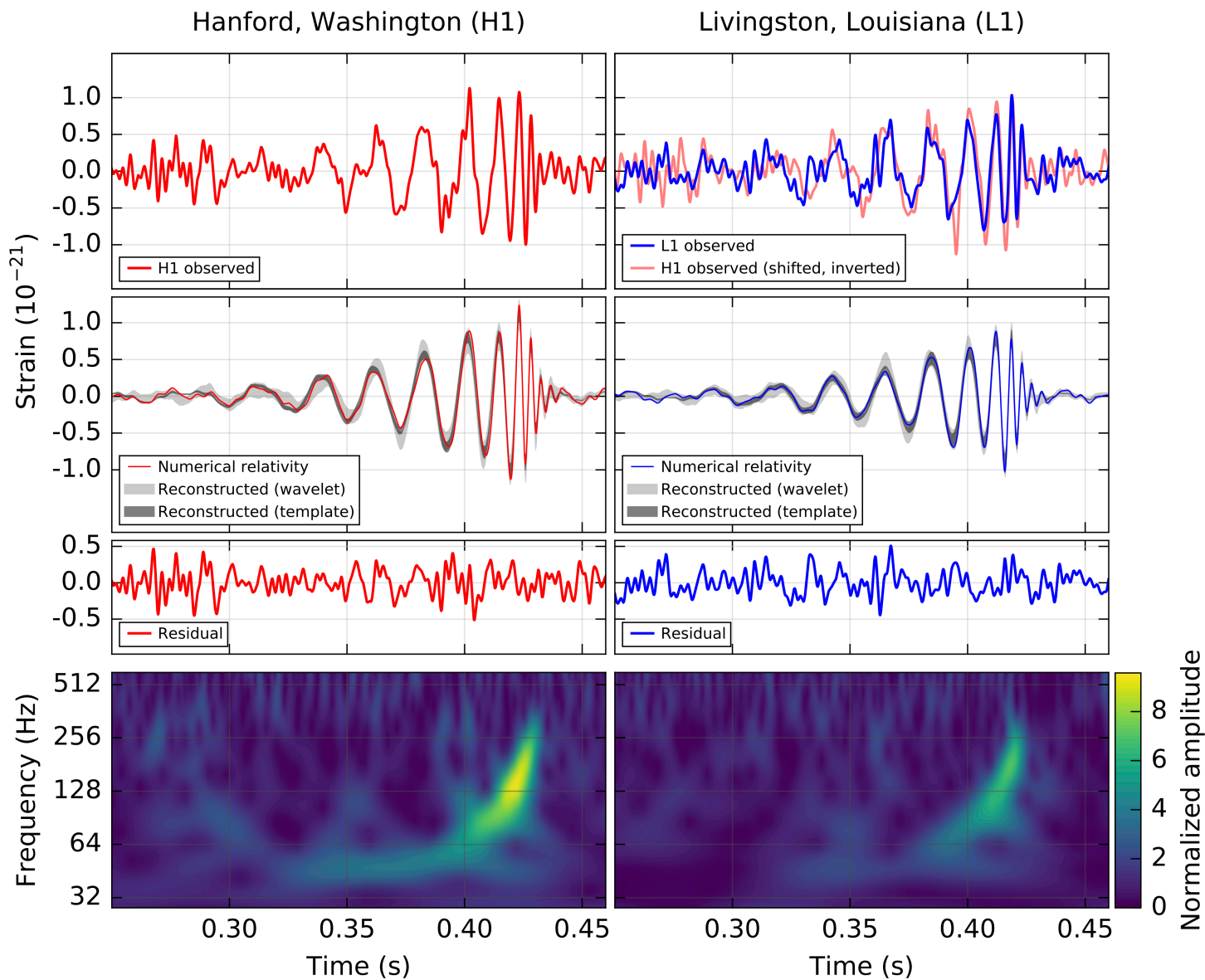


GW150914: Observation of Gravitational Waves from a Binary Black Hole Merger

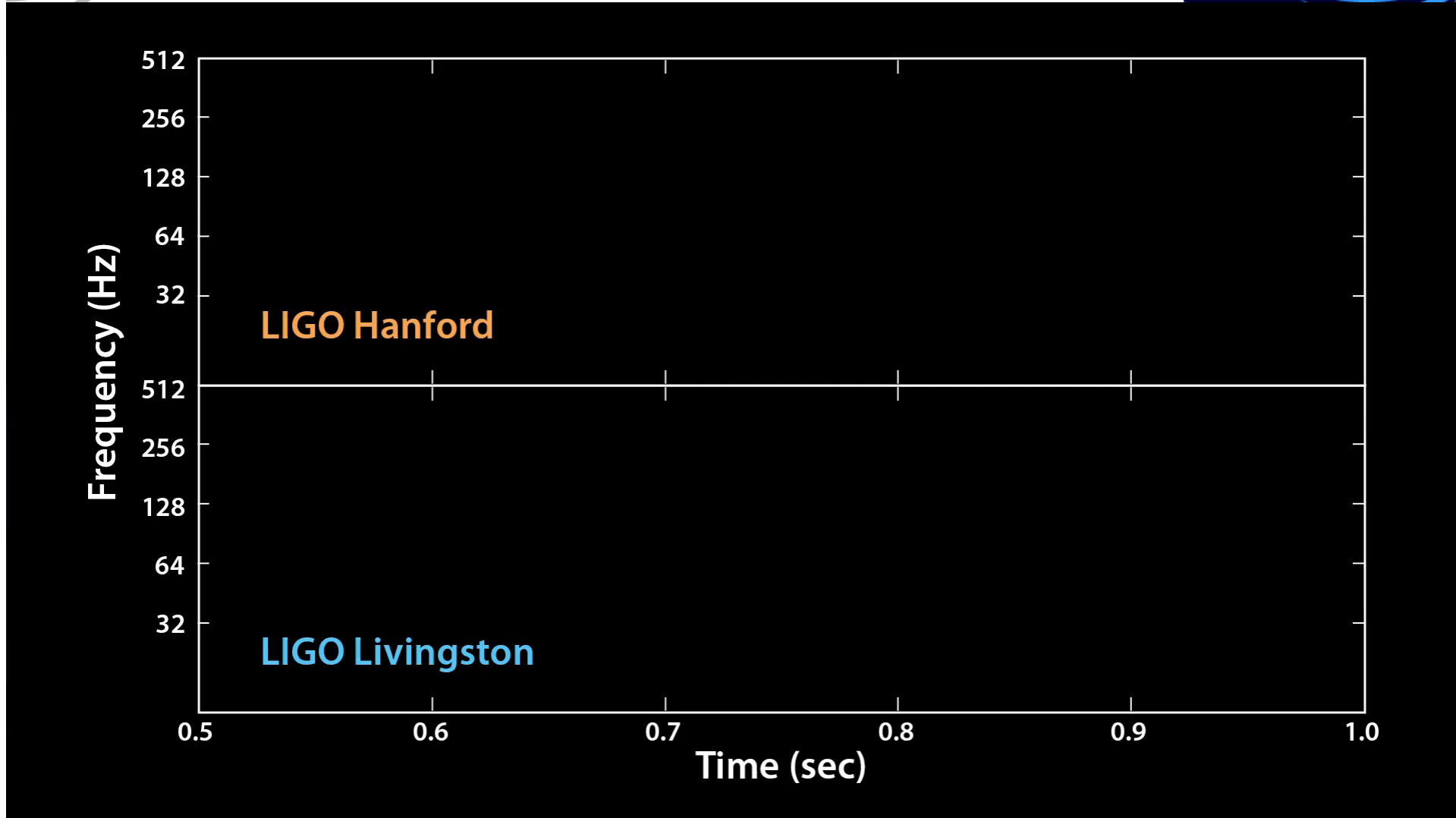




What was observed?

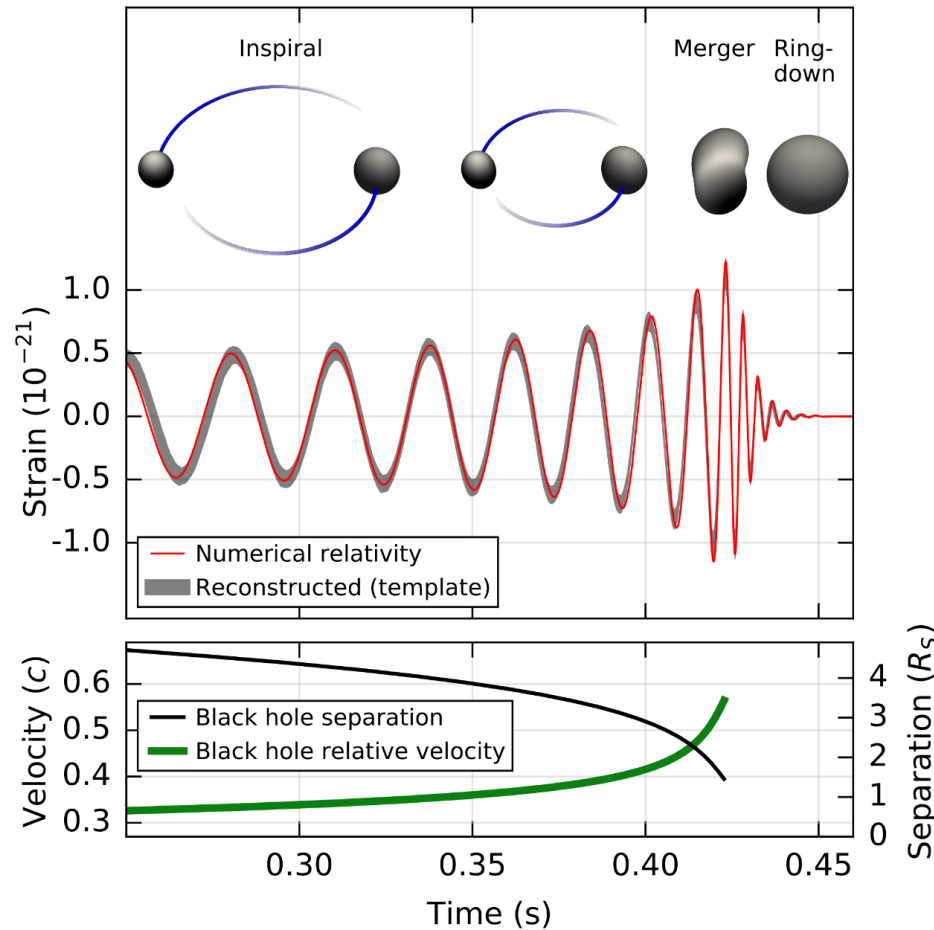


LI



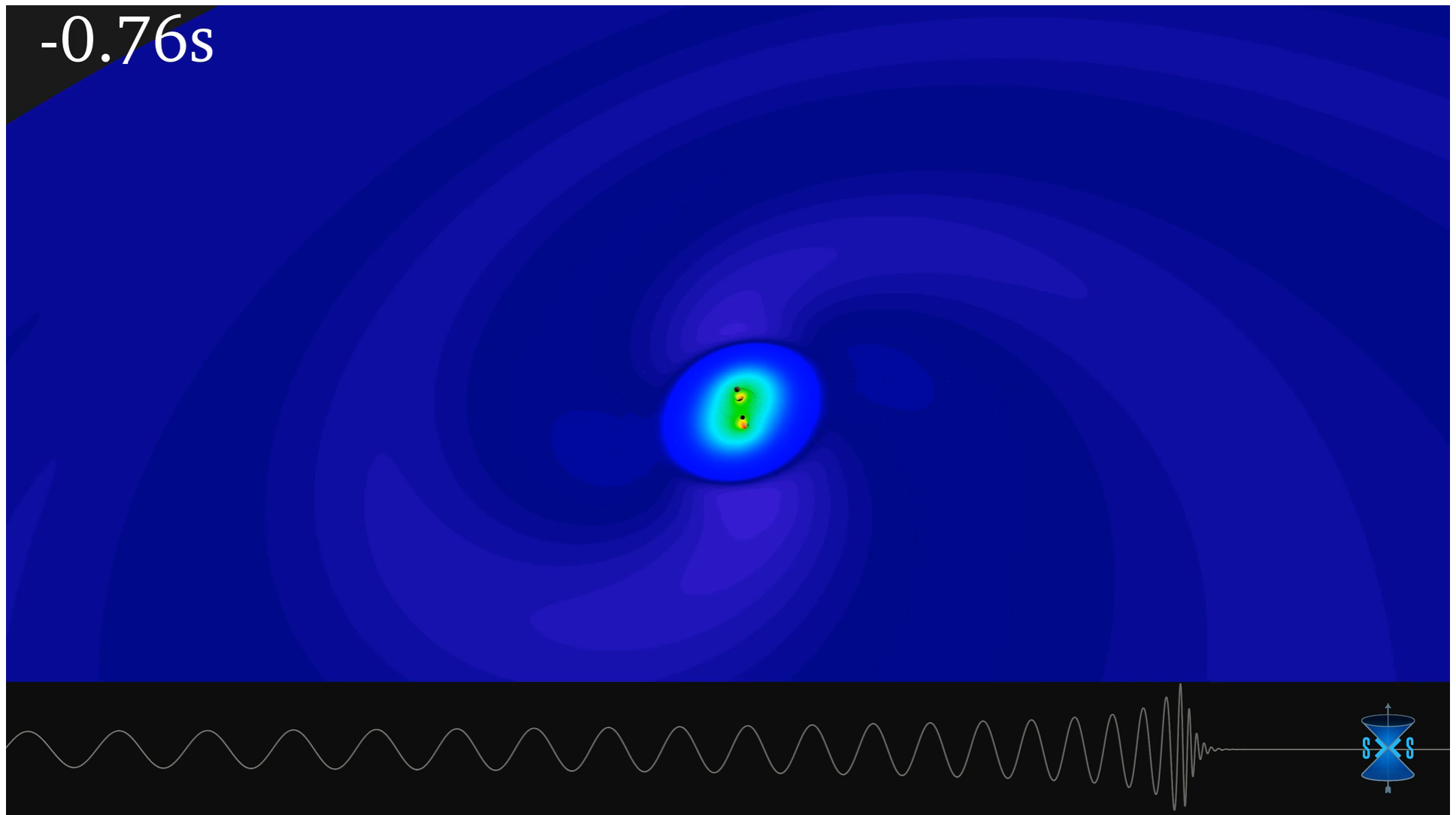


LIGO A signal from a binary black hole merger

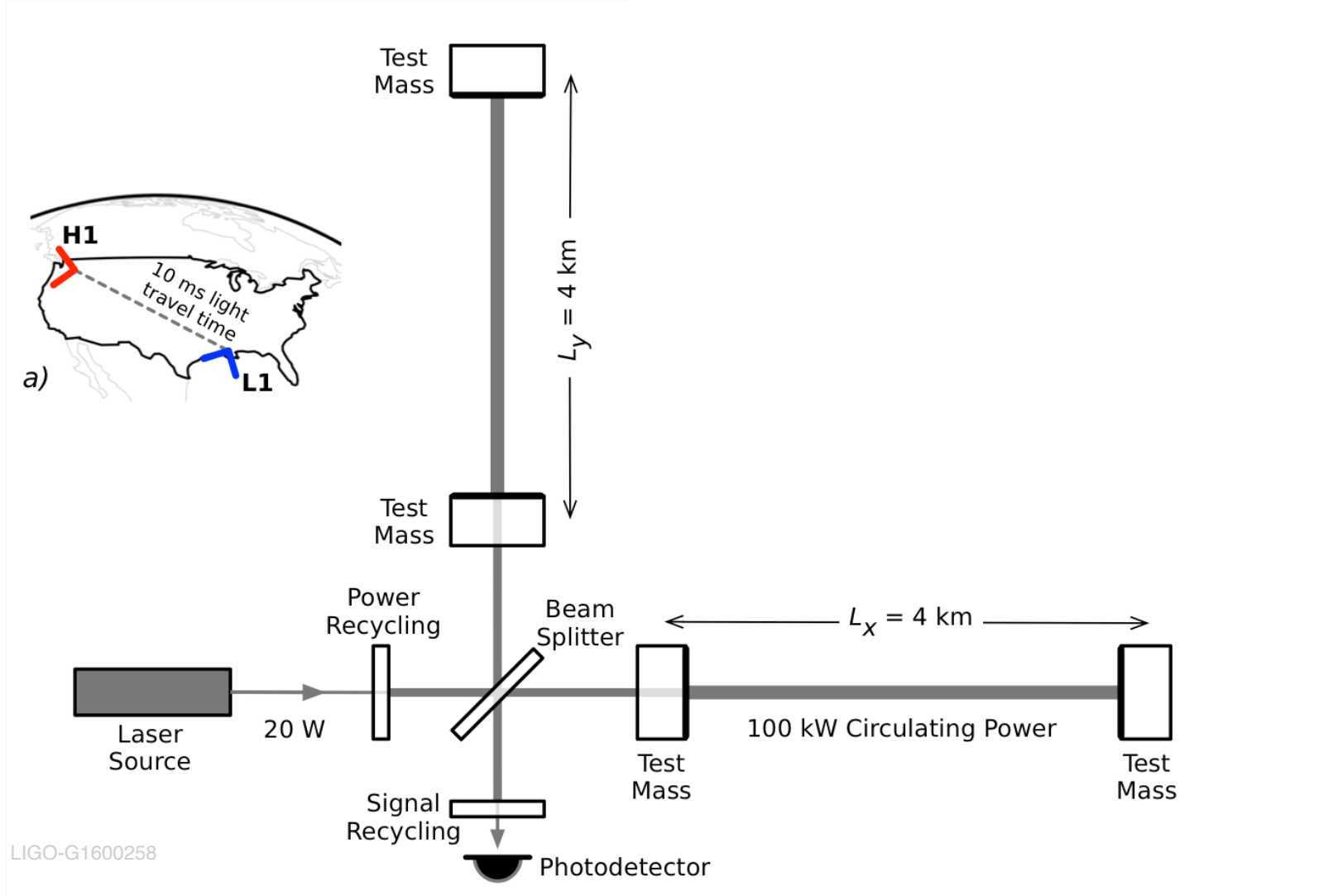




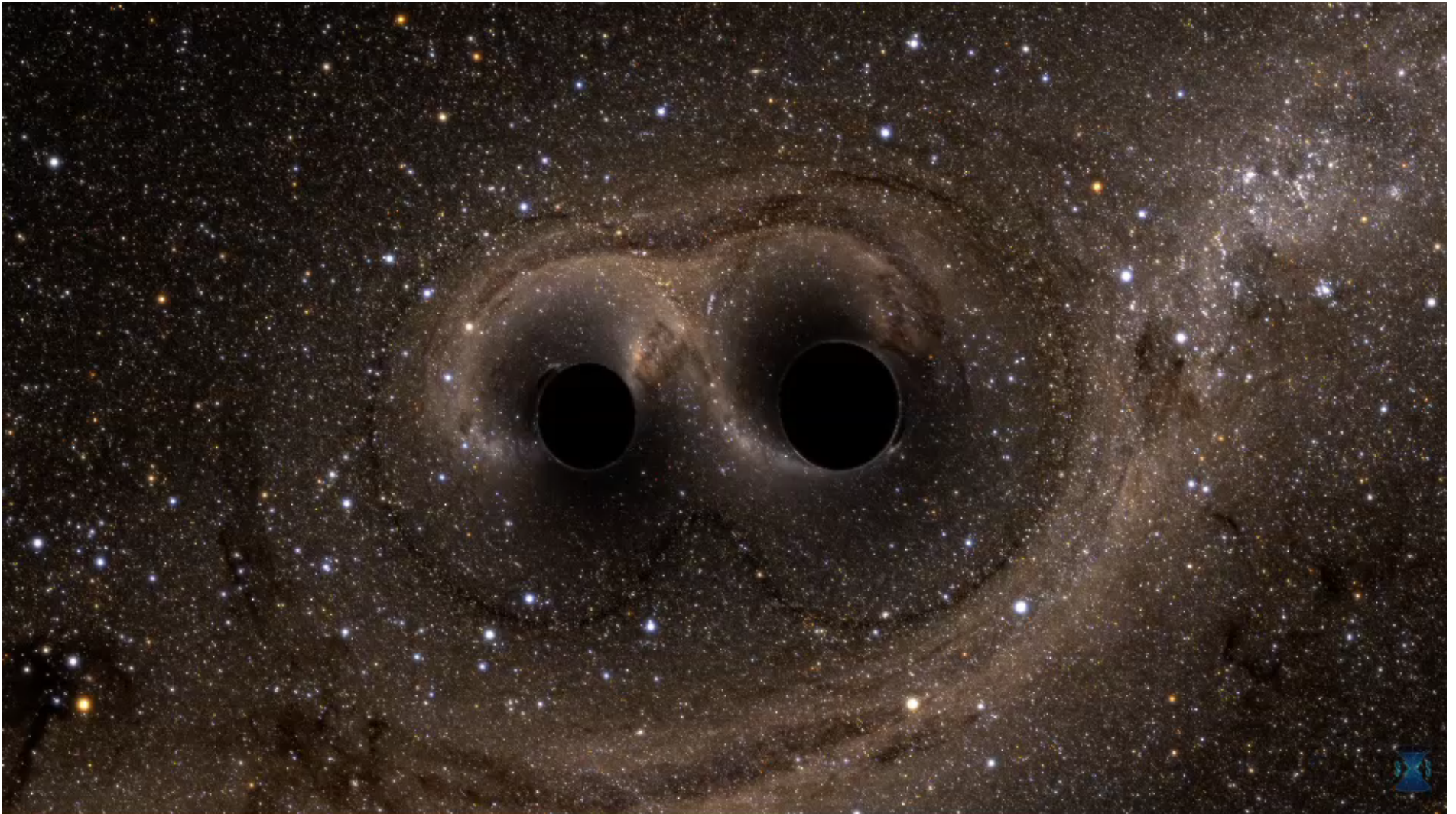
LIGO A signal from a binary black hole merger



The detector works



First-ever tests of Einstein's theories under dynamical, extreme-gravity conditions





Amazing Facts about GW150914



3 times the mass of the sun (1 million times the mass of Earth) turned into energy vibrating the fabric of spacetime

Peak power more than
10,000,000,000,000,000,000,000,000,000,000,000,000,000 times the output of the Columbia Generating Station

Relative distance change same as **changing distance to nearest star by width of human hair**

Merger actually happened more than **1 billion years ago**

In the volume that we can see systems like GW150914, there are more than **5 million galaxies**



Original detection strategy succeeds!



Proposal to the National Science Foundation

THE CONSTRUCTION, OPERATION, AND SUPPORTING RESEARCH AND DEVELOPMENT OF A

LASER INTERFEROMETER GRAVITATIONAL-WAVE OBSERVATORY

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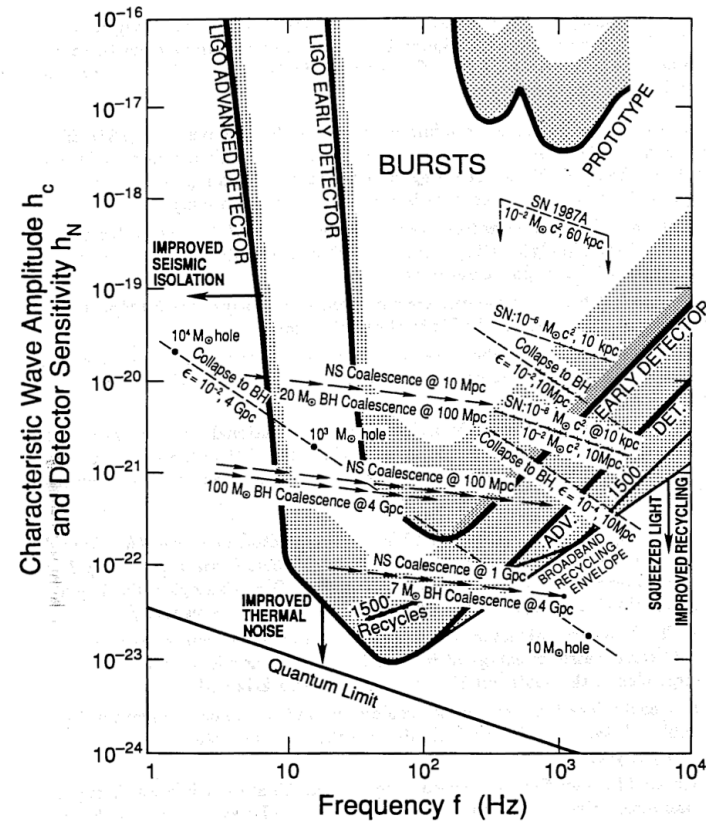


Figure II-2 A comparison of the strengths of gravitational waves (characteristic amplitude h_c and frequency f) for burst signals from various sources (dashed lines and arrows), and benchmark sensitivities h_N (solid curves and stippled strips atop them) for interferometric detectors today (prototype) and in the proposed LIGO (early detector, advanced detector). See the caption of Figure A-4a (a duplicate of this figure) and the associated discussion in Appendix A for more details.



LIGO A signal from a binary black hole merger

