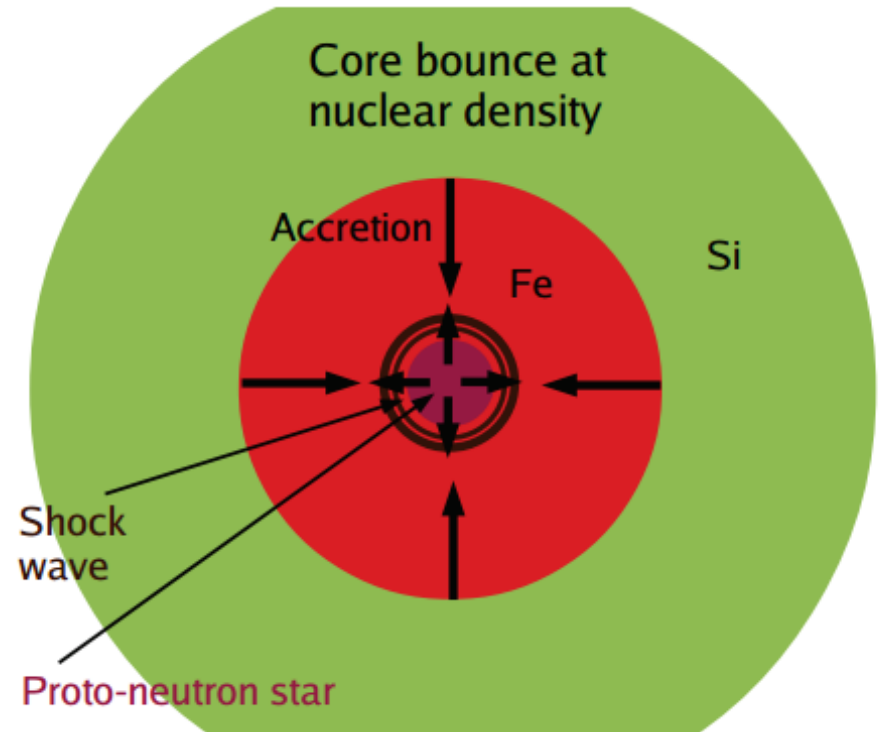
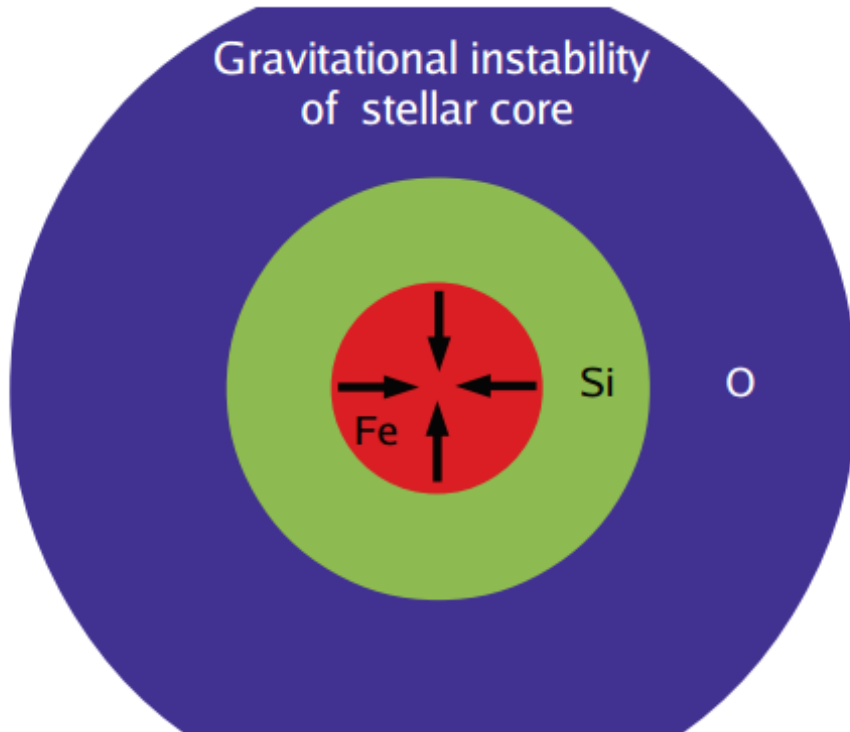


SN Classification Study

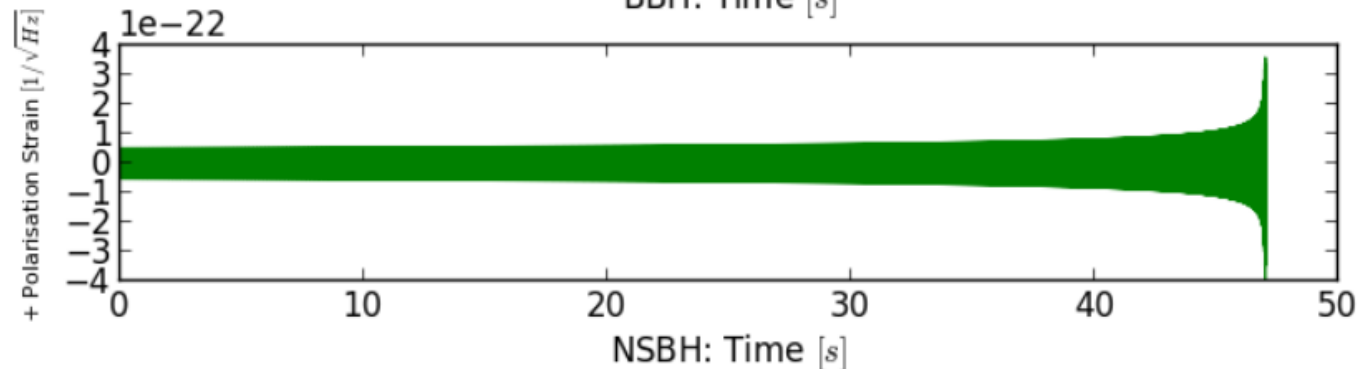
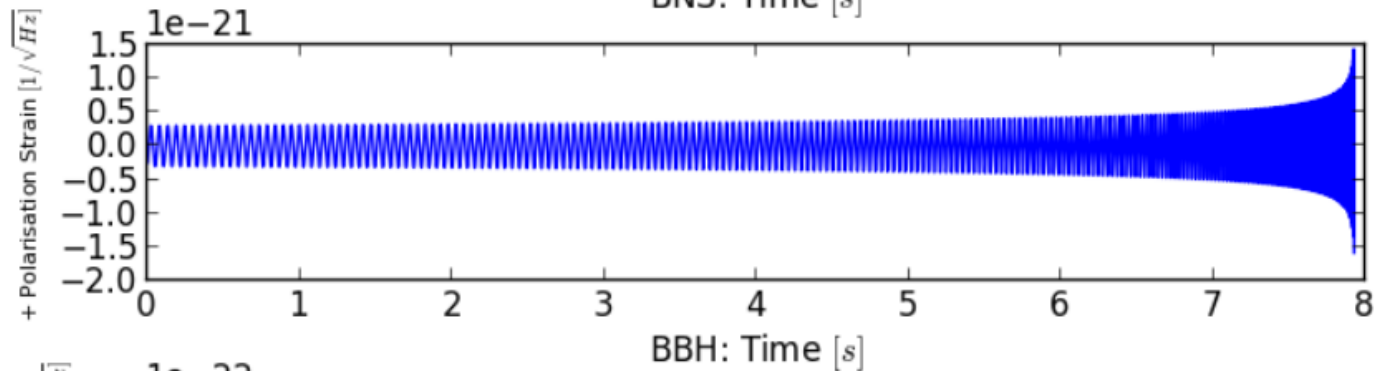
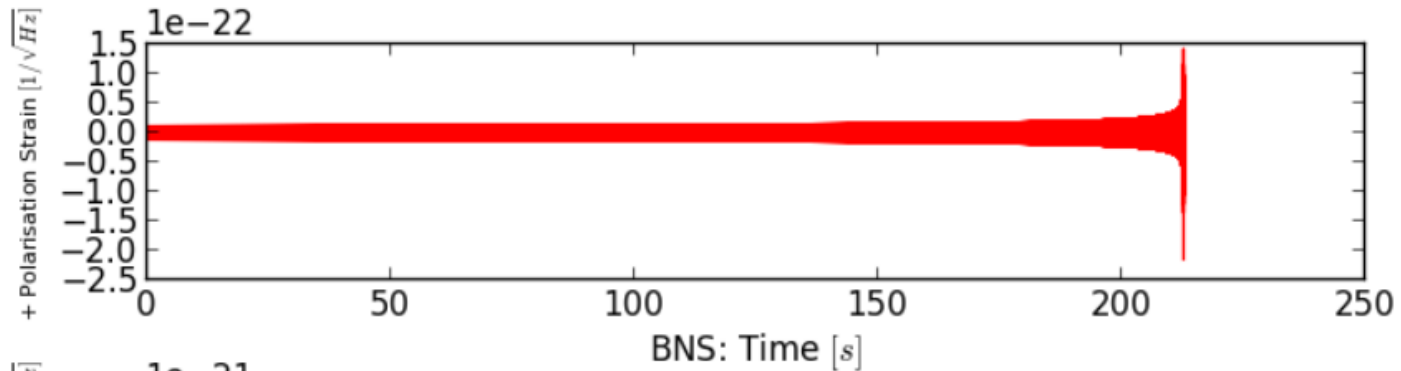
Vincent Roma
SN F2F 2016

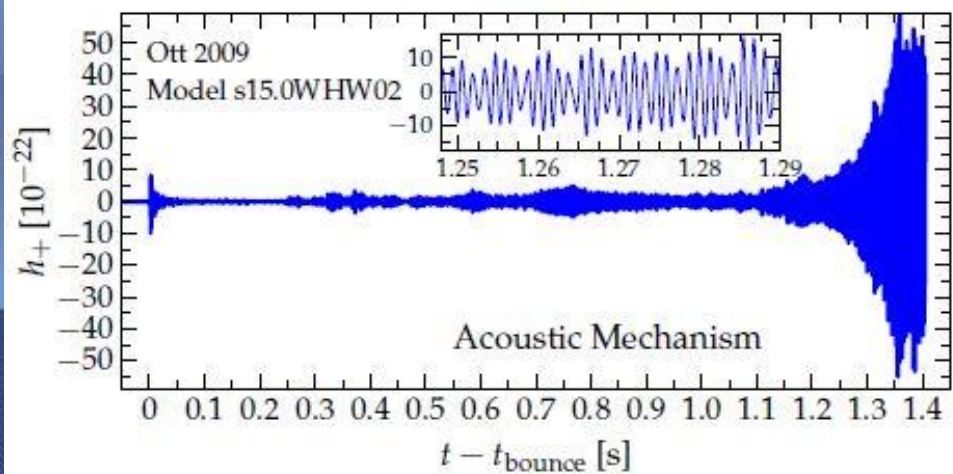
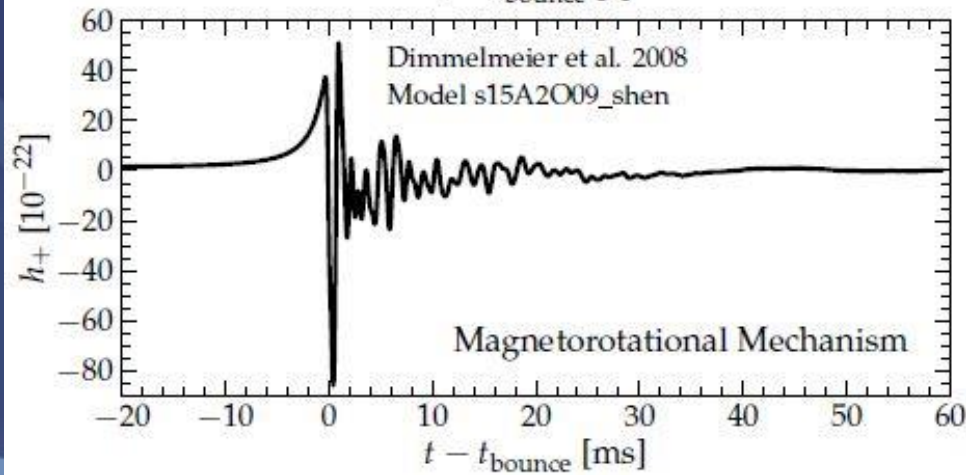
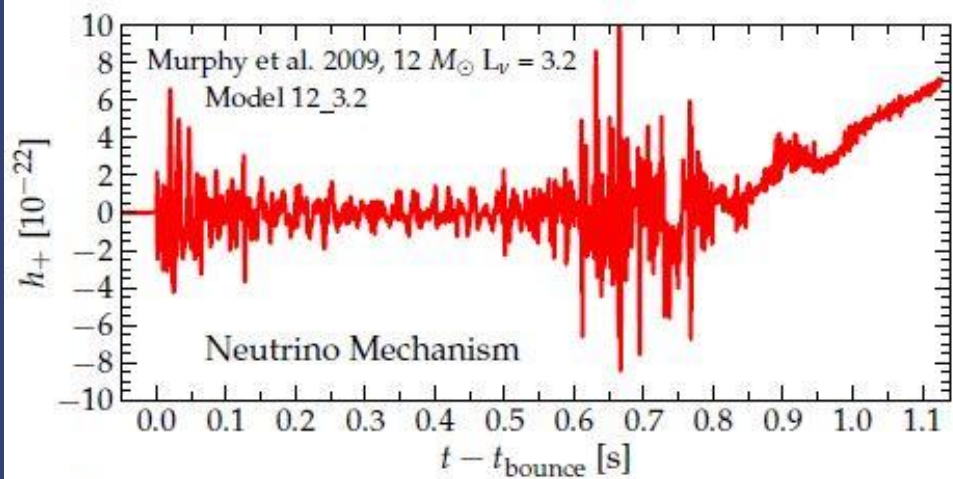


Core Collapse and Bounce



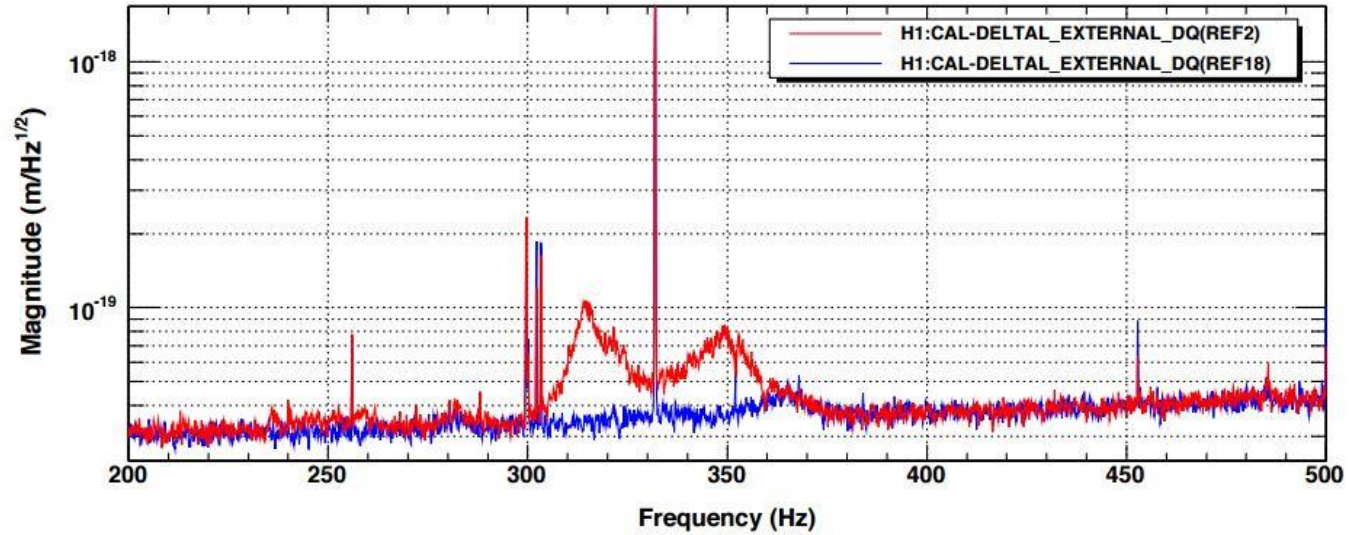
CBC Waveforms



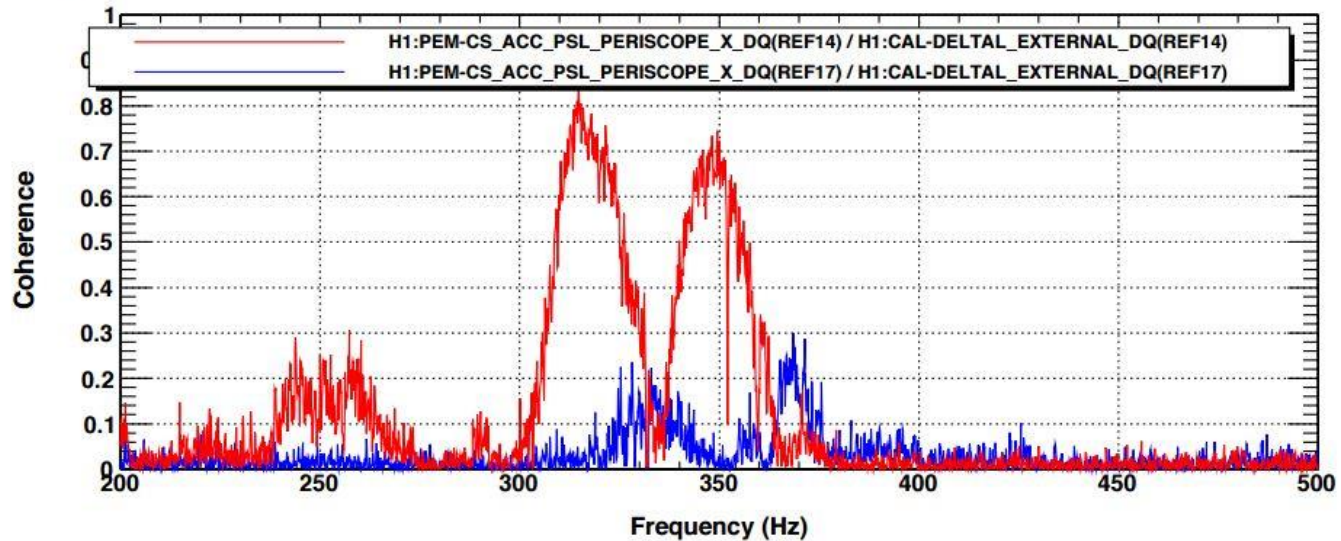


PSL Periscope Before and After Improvement

Power spectrum



Coherence



Preliminary Results

October 12 2015 | October 17 2015

Injected Waveform		Log B_{DN} (Dim PCs)			Log B_{MN} (Mur PCs)	
	.2 kpc	2 kpc	10 kpc	.2 kpc	2 kpc	10 kpc
Dim	303311 232650	3079 2329	123 83	106490 76438	31 491	-1.7 9.3
Mur	385 241	2.7 -0.4	-0.7 -0.5	244 161	-1.4 -0.6	-2.8 -1.0

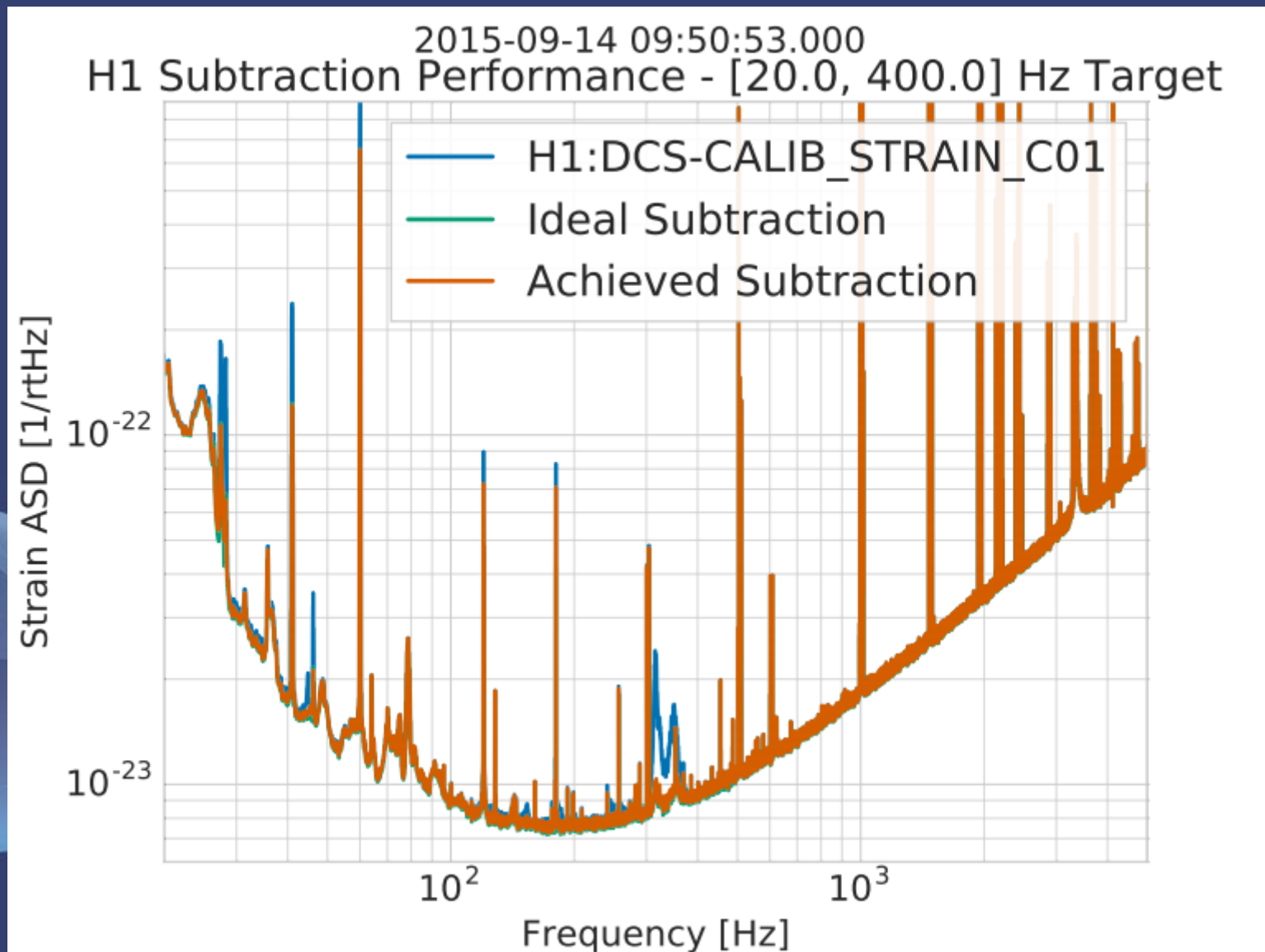
Dimmelmeier Injections

Distance [kpc]	Oct 12 $\log B_{DM}$	Oct 17 $\log B_{DM}$
.2	196821	156212
2	3048	1838
10	125	74

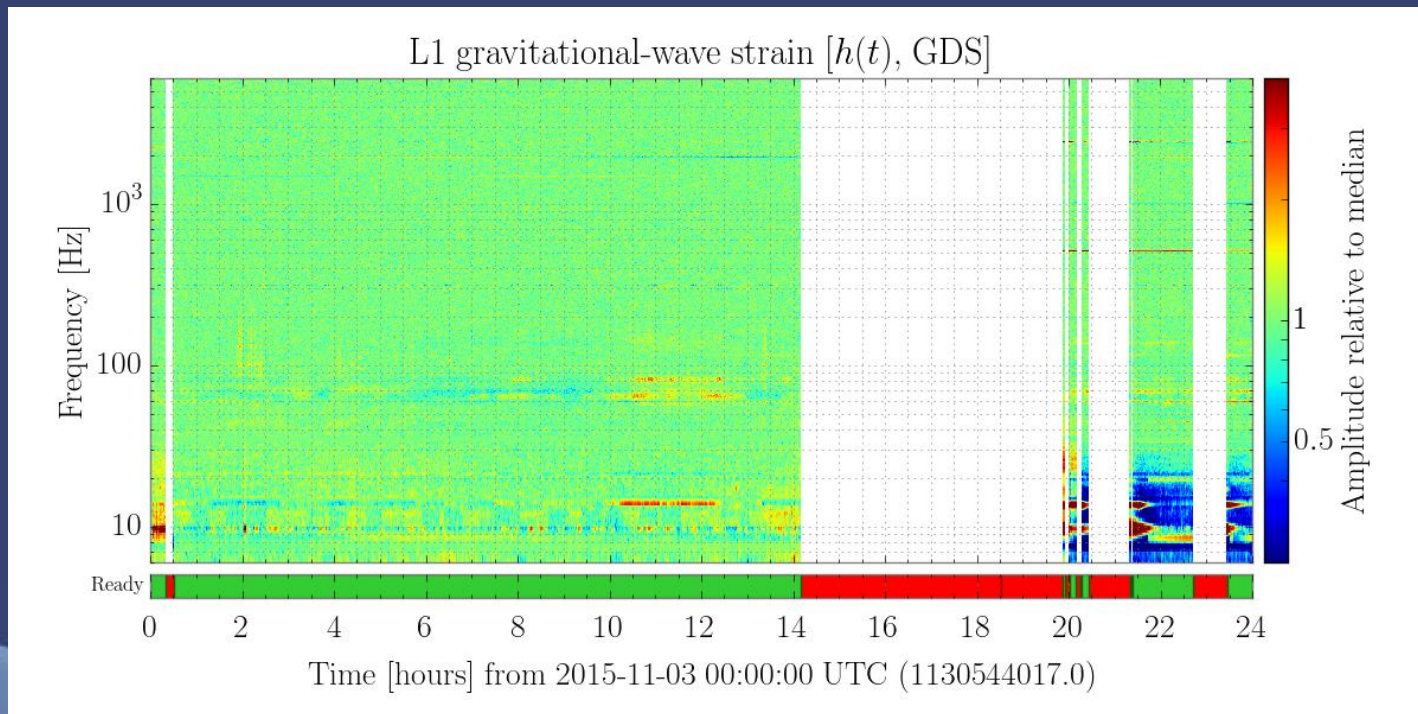
Murphy Injections

Distance [kpc]	Oct 12 $\log B_{MD}$	Oct 17 $\log B_{MD}$
.2	-141	-80
2	-4.1	-0.2
10	-2.1	-0.5

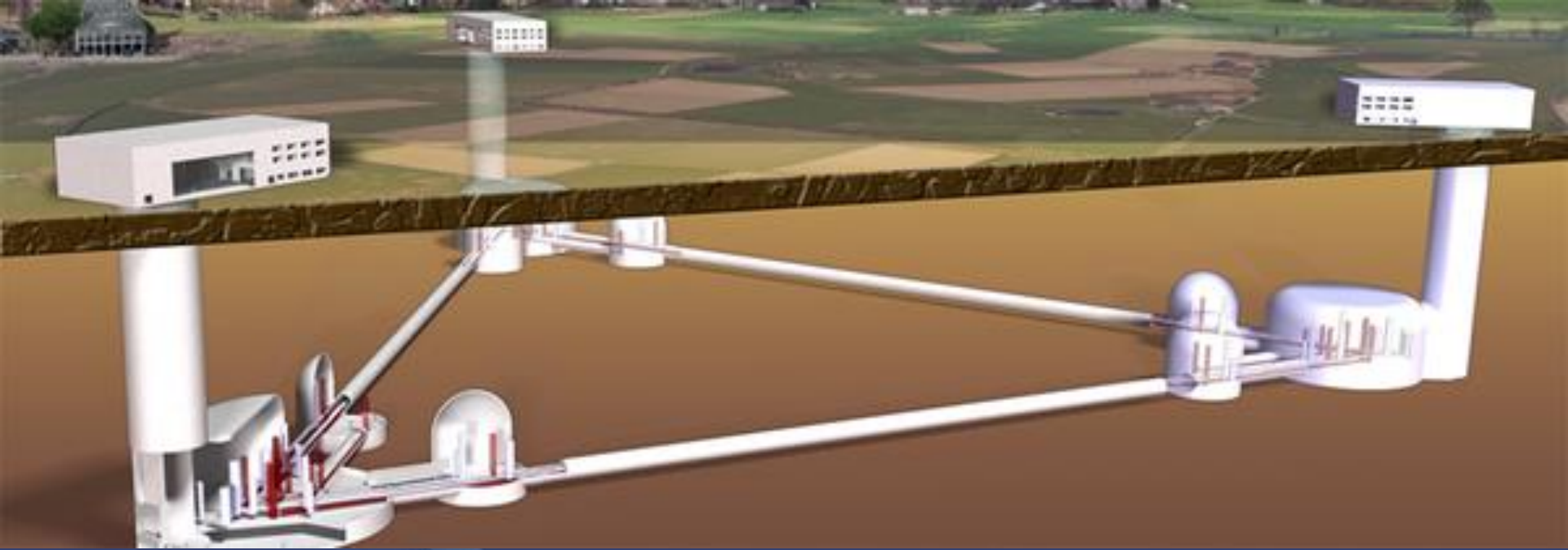
Noise Subtraction with Wiener Filtering



Other Environmental Noise Sources



- “Noise breathing” at LLO. Mainly $\sim 55 - 90$ Hz.
- Inevitable future noise sources found in O2.
- Perform noise subtraction to study possible improvements to SN classification and parameter estimation.



Map Out SN Waveform Classification and Parameter Estimation in Future Detectors

- A+ improvements to existing LIGO interferometers
- LIGO Voyager
- Einstein Telescope

References

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2. http://www.phys.ufl.edu/ireu/IREU2013/pdf_reports/JennaKlemkowsky.pdf
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5. Logue, Josh. "Inferring Core-Collapse Supernovae Physics with Gravitational Waves" (2013). [LIGO-G1300650-v1](#)

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