LIGO

Update on LIGO instruments
OpenLVKEM town hall, 15 December 2022

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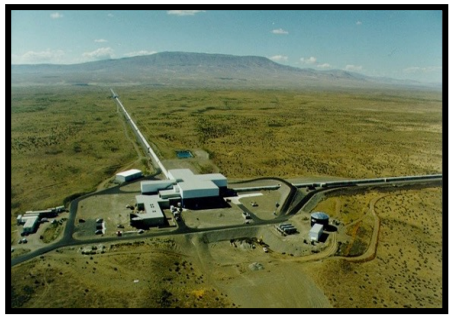
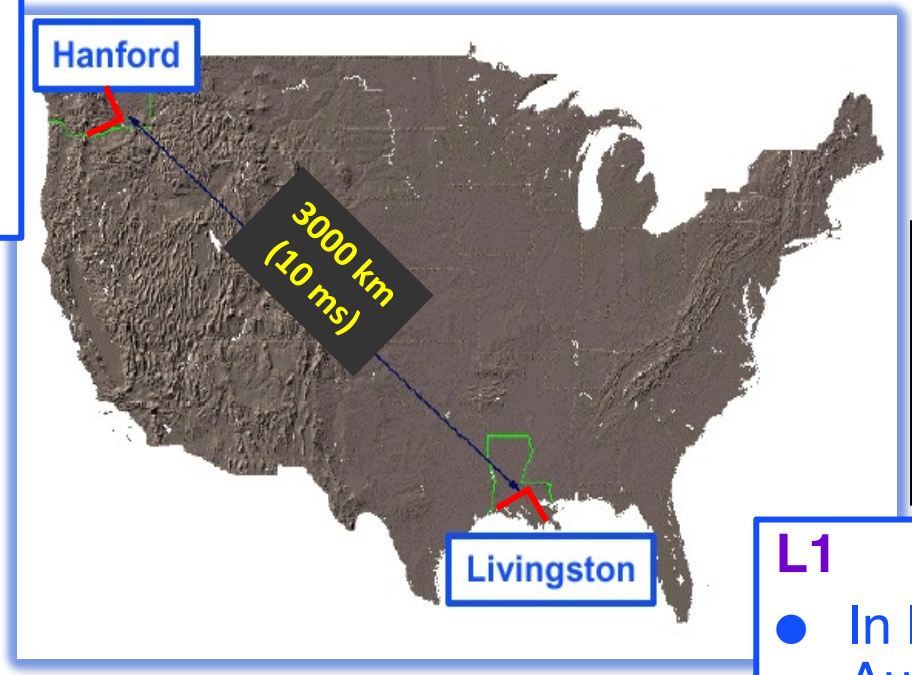
LIGO-G2202195-v1

LIGO Interferometer Status

H1

- In **Commissioning mode** since beginning November
- Including new Filter Cavity since end November





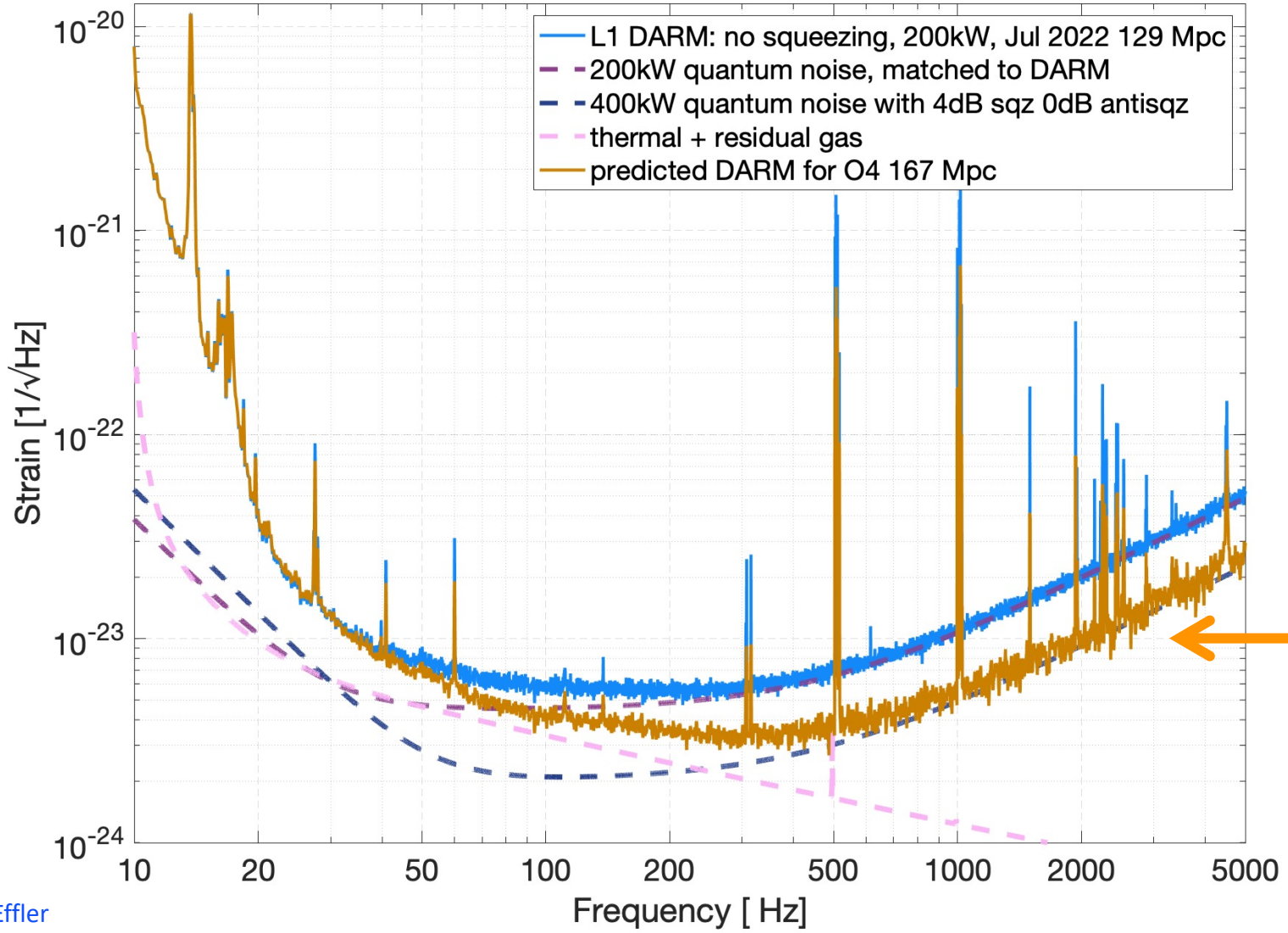
L1

- In **Installation mode** since August for replacement of both End Test Masses
- Commissioning will commence in January

Summary of LIGO Improvement Goals

	Hanford, H1		Livingston, L1	
400 kW circulating arm power	✓		Starting in Jan.	
Squeezed light efficacy **4.5 dB**	✓	In progress	✓	Starting in Jan.
300 m filter cavity for frequency-dependent squeezing	Installation complete		Installation complete	
Low frequency technical noise reduction (f < 100 Hz)	In progress		✓	
Binary Neutron Star inspiral detection range: **160-190 Mpc**	120 Mpc, w/out squeezing		130 Mpc, w/out squeezing, low power	

O4 Projection for L1



Start w/ July 2022 spectrum

- Double the laser power
- + 4 dB of squeezing
- 0 dB of anti-squeezing thanks to the filter cavity (no radiation pressure increase)

167 Mpc BNS range, predicted

Plot from A. Effler