ET Sensitivity curves

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Where to find valid sensitivity curves?

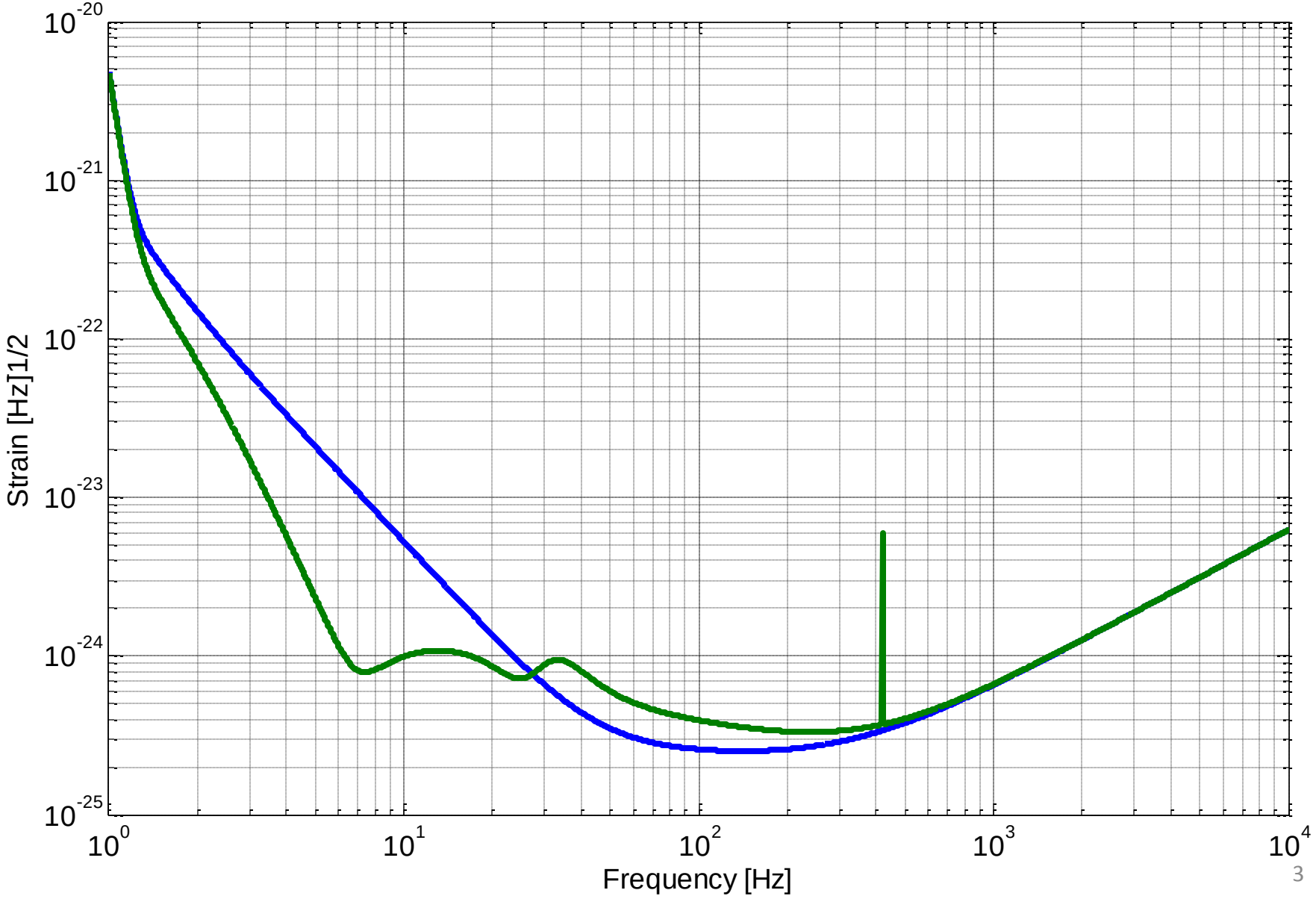
- http://www.et-gw.eu/etsensitivities or

https://workarea.et-gw.eu/et/WG4-Astrophysics/base-sensitivity

The sensitivity data can be downloaded as ASCII format (*.txt) or Matlab workspace (*.mat):

Curve Model	txt file	Matlab workspace
ET_B	download here	download here
ET_C	download here	download here

Broadband or Xylophone?



Noise contributions broadband

Pushing towards the ET sensitivity using 'conventional' technology

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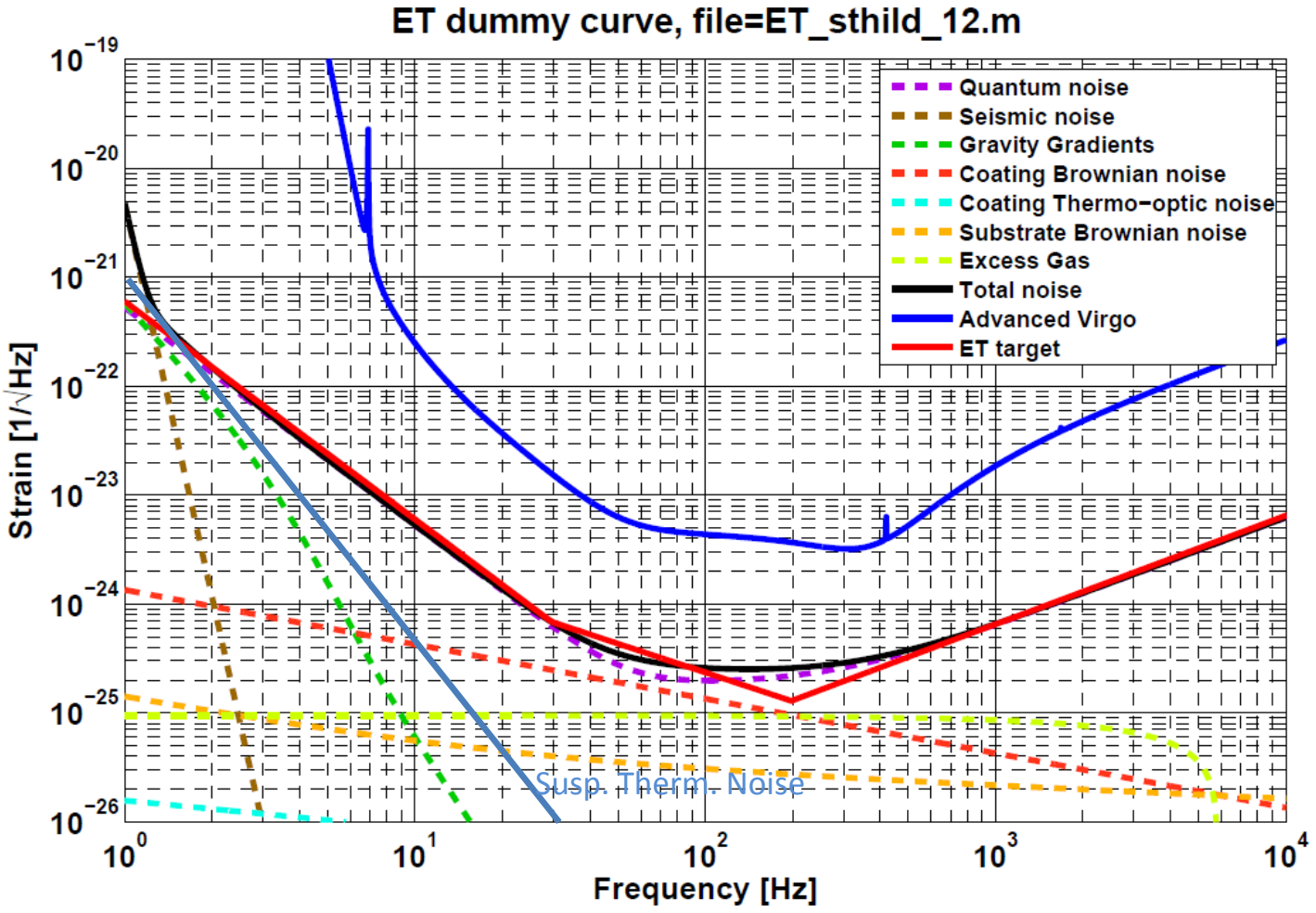
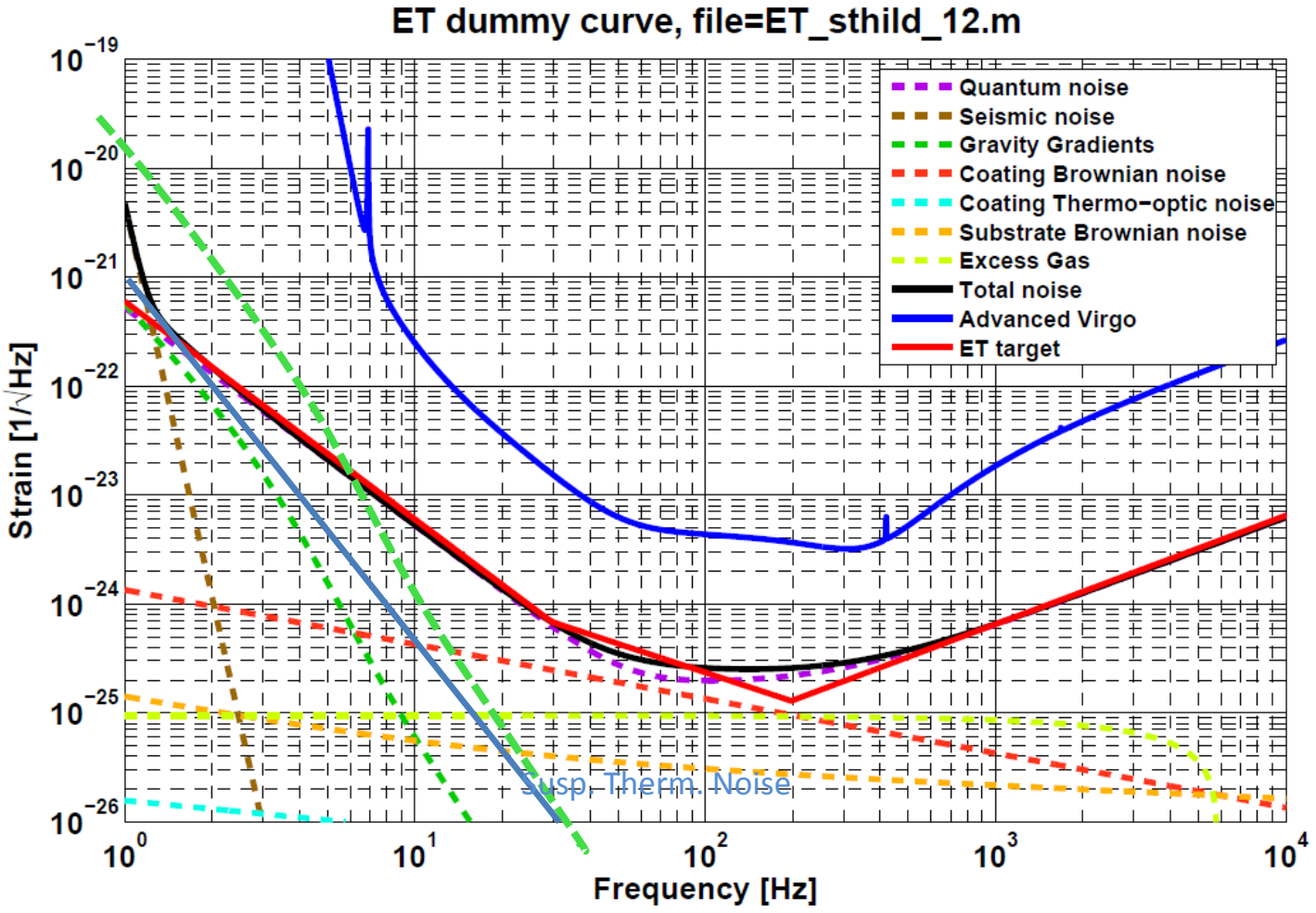
Issue: 2
Date: November 24, 2008

Noise contributions broadband



Gravity Gradient noise

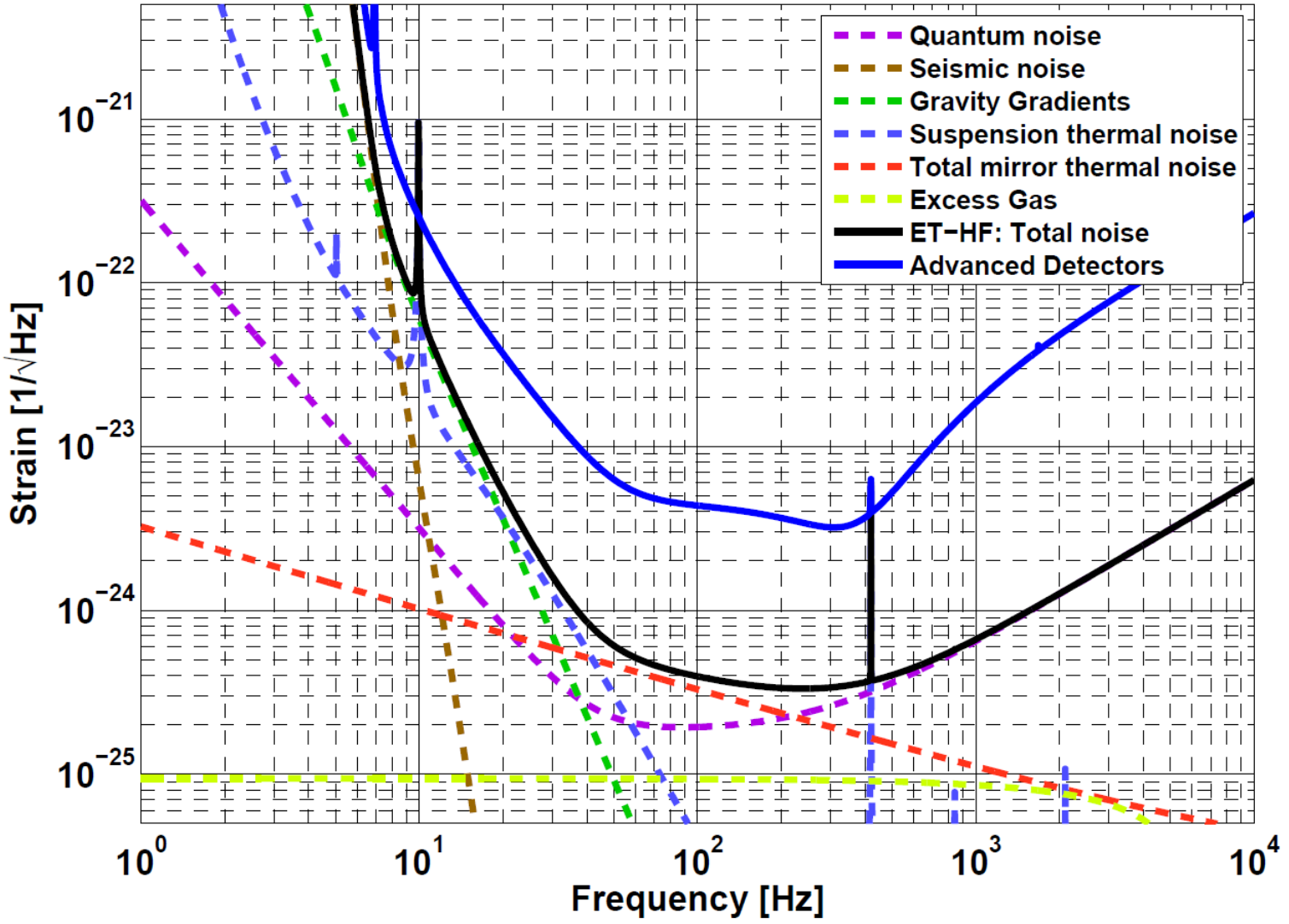


Broadband Parameters

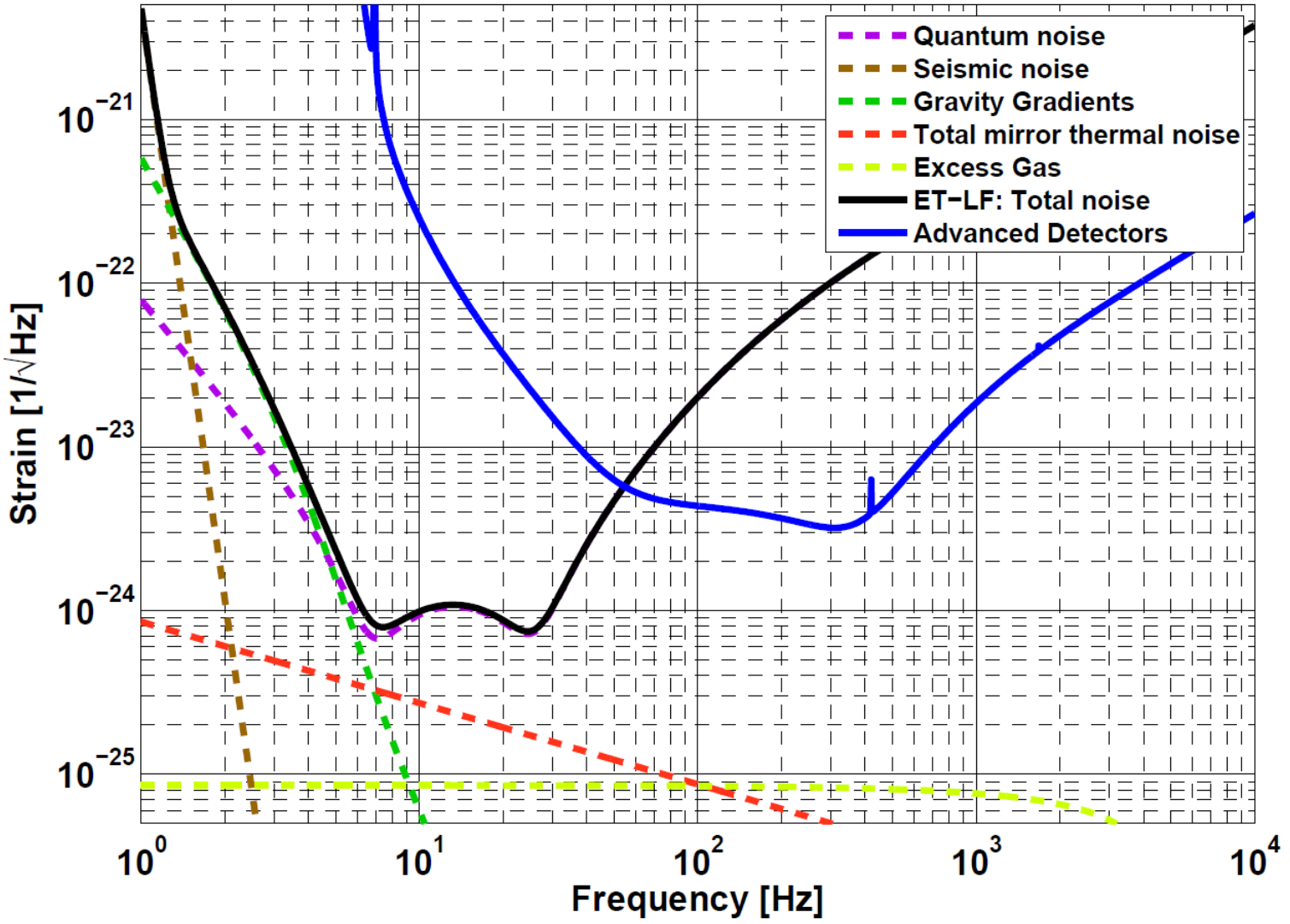
	advanced detector	potential ET design
Arm length	3 km	10 km
SR-phase	detuned (0.15)	tuned (0.0)
SR transmittance	11 %	10 %
Input power (after IMC)	125 W	500 W
Arm power	0.75 MW	3 MW
Quantum noise suppression	none	10 dB
Beam radius	6 cm	12 cm
Temperature	290 K	20 K
Suspension	Superattenuator	5 stages of each 10 m length
Seismic	$1 \cdot 10^{-7}\,\mathrm{m}/f^2$ for $f > 1$ Hz (Cascina)	$5 \cdot 10^{-9}\,\mathrm{m}/f^2$ for $f > 1$ Hz (Kamioka)
Gravity gradient reduction	none	factor 50 required (cave shaping)
Mirror masses	42 kg	120 kg
BNS range	150 Mpc	2650 Mpc
BBH range	800 Mpc	17700 Mpc

Temp. of 20K for coating thermal noise reduction.
If alternative techniques allow red. coating thermal noise, 300K could be used.

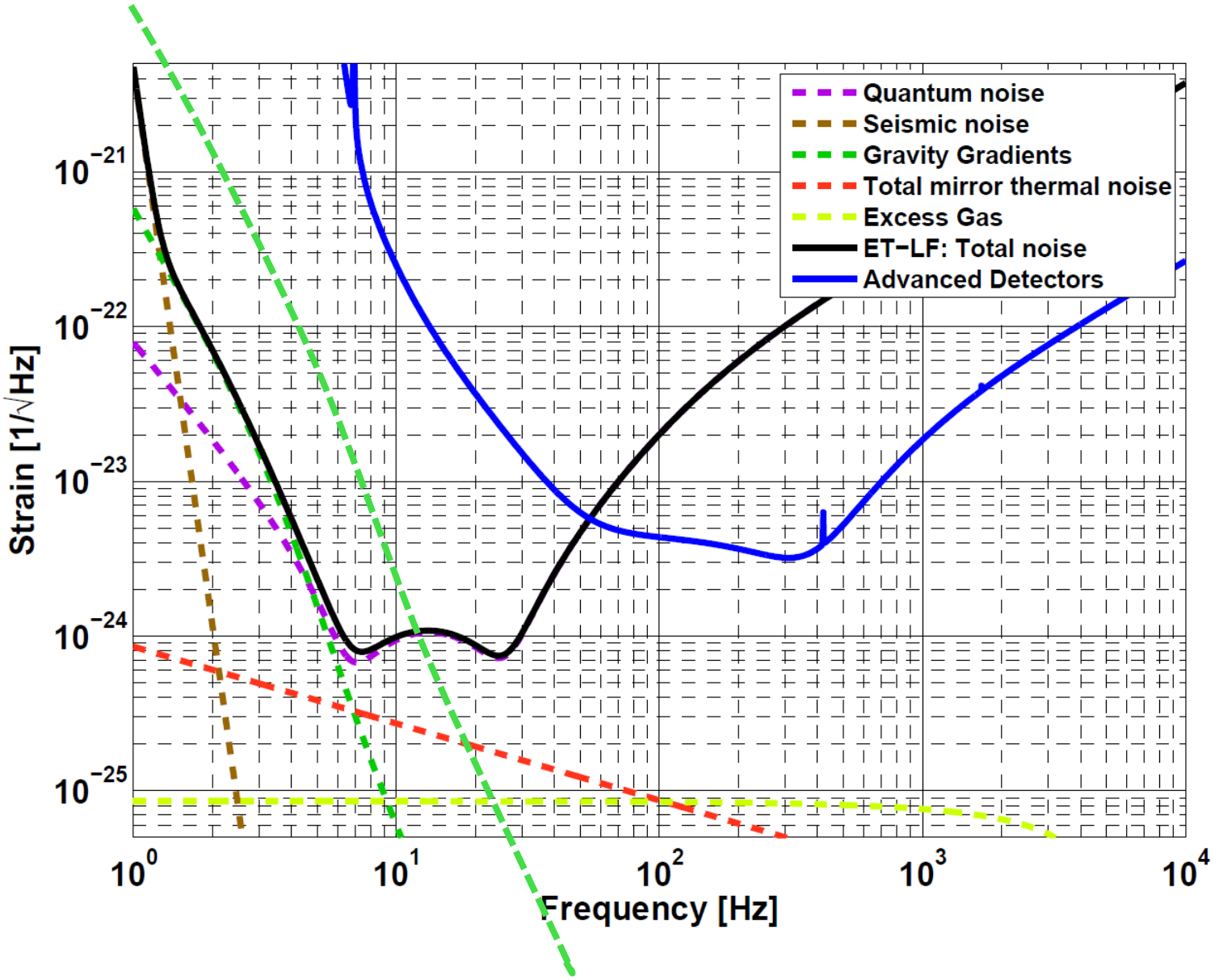
Noise contributions Xylophone



Noise contributions Xylophone

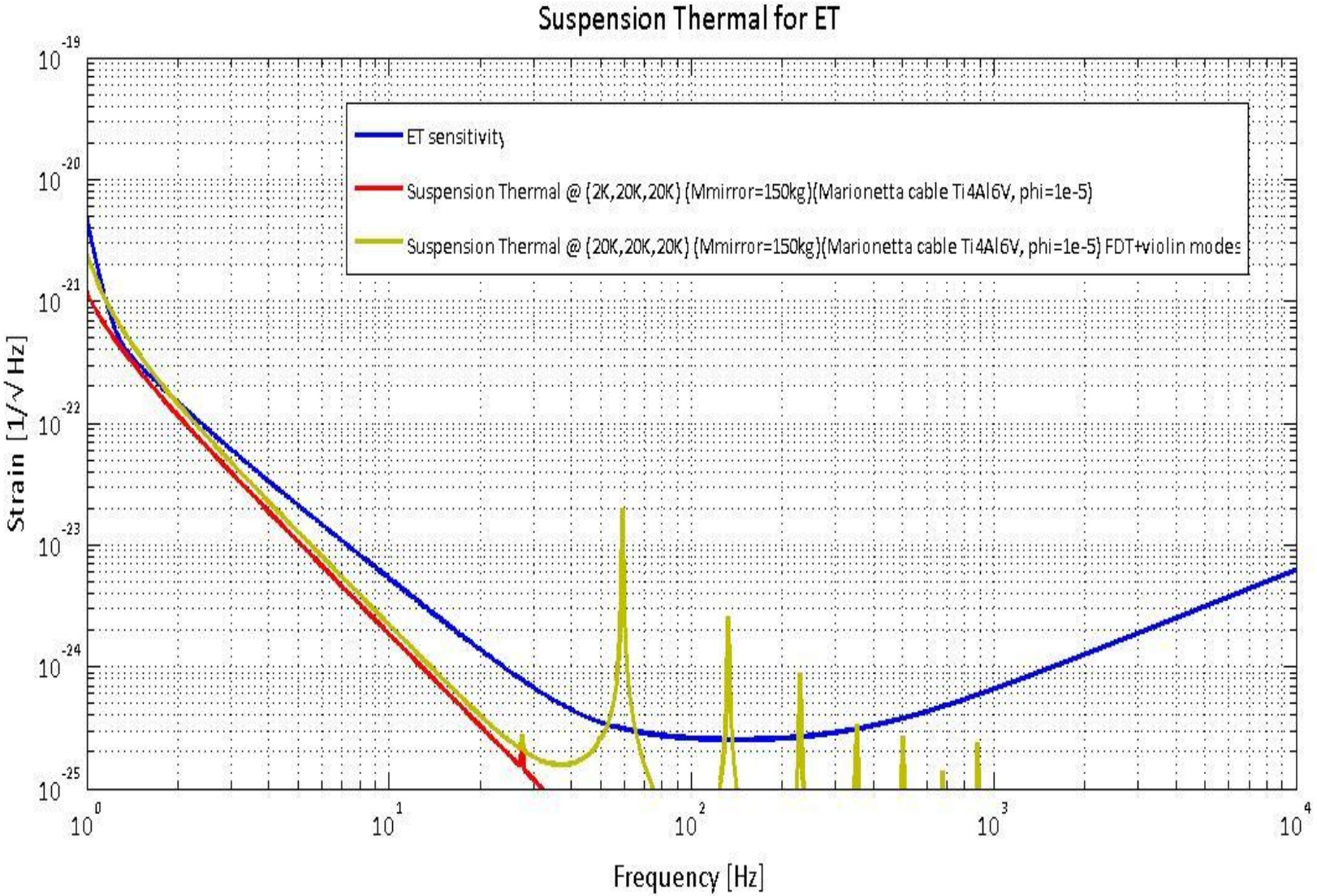


Noise contributions Xylophone

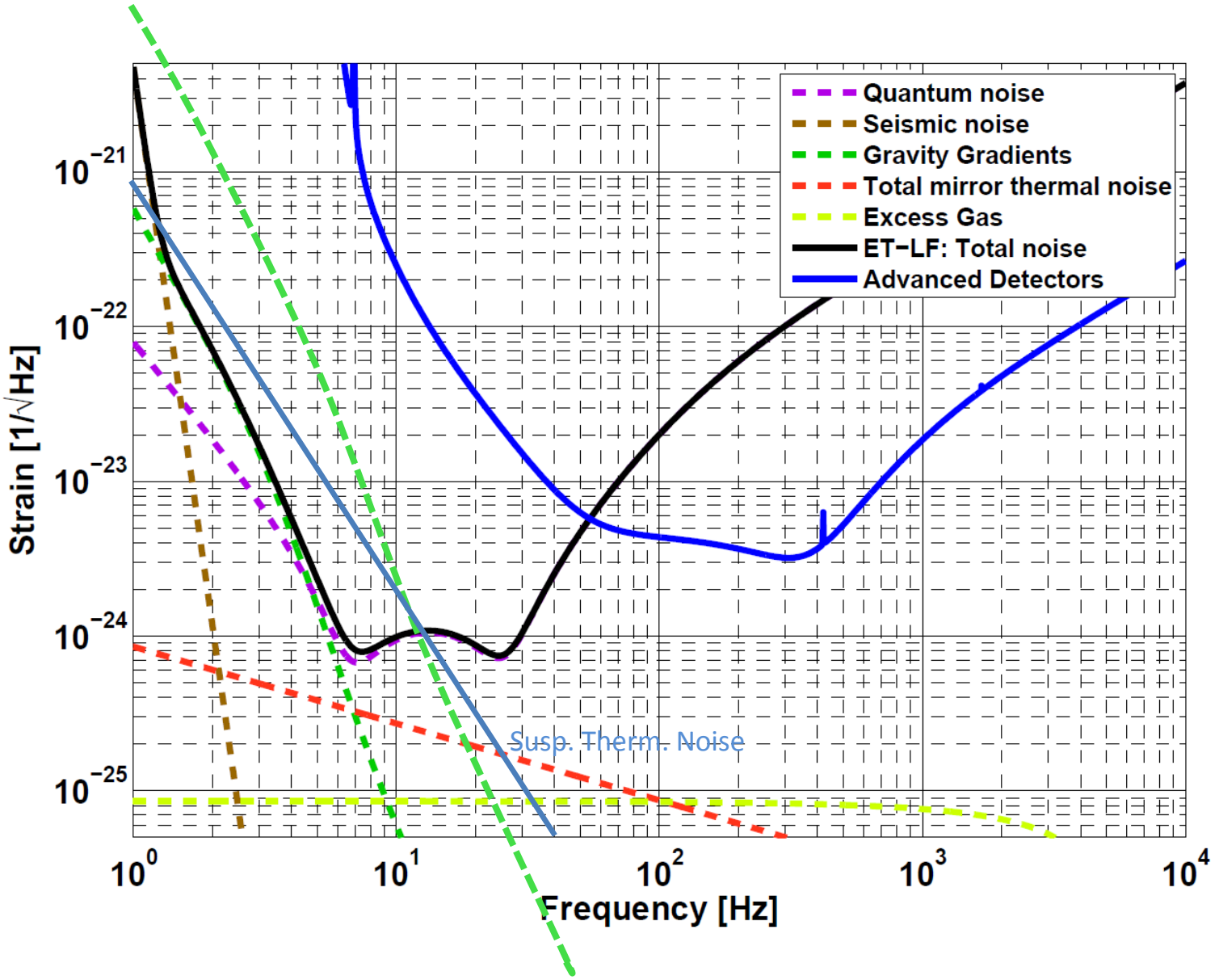


Suspension Thermal: comparison with FDT @ 20K + violin modes

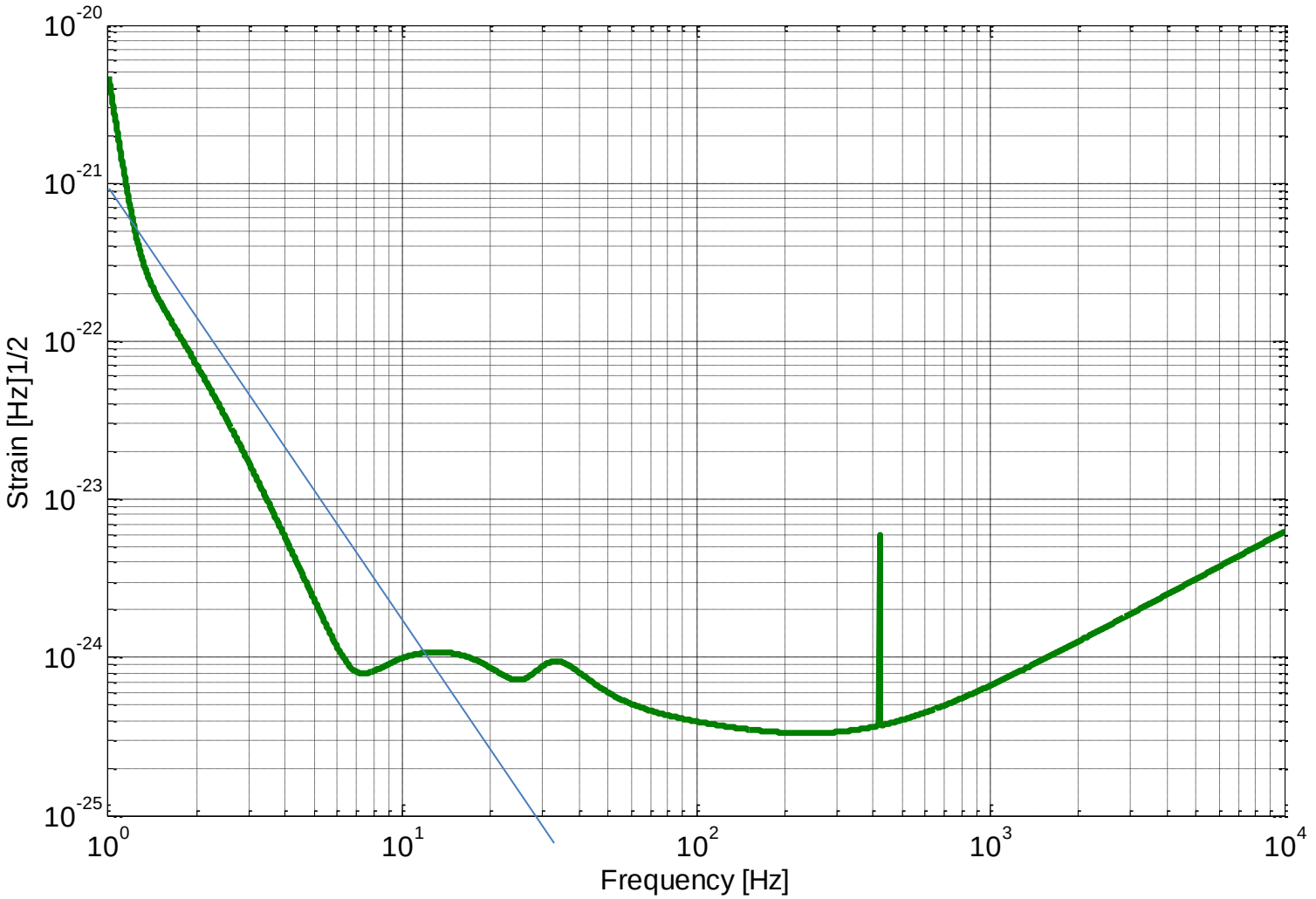
From : https://workarea.et-gw.eu/et/WG2-Suspensions/wp2-meeting-genova-sept-15-2009/Puppo_ETThermal_150909.pptx/



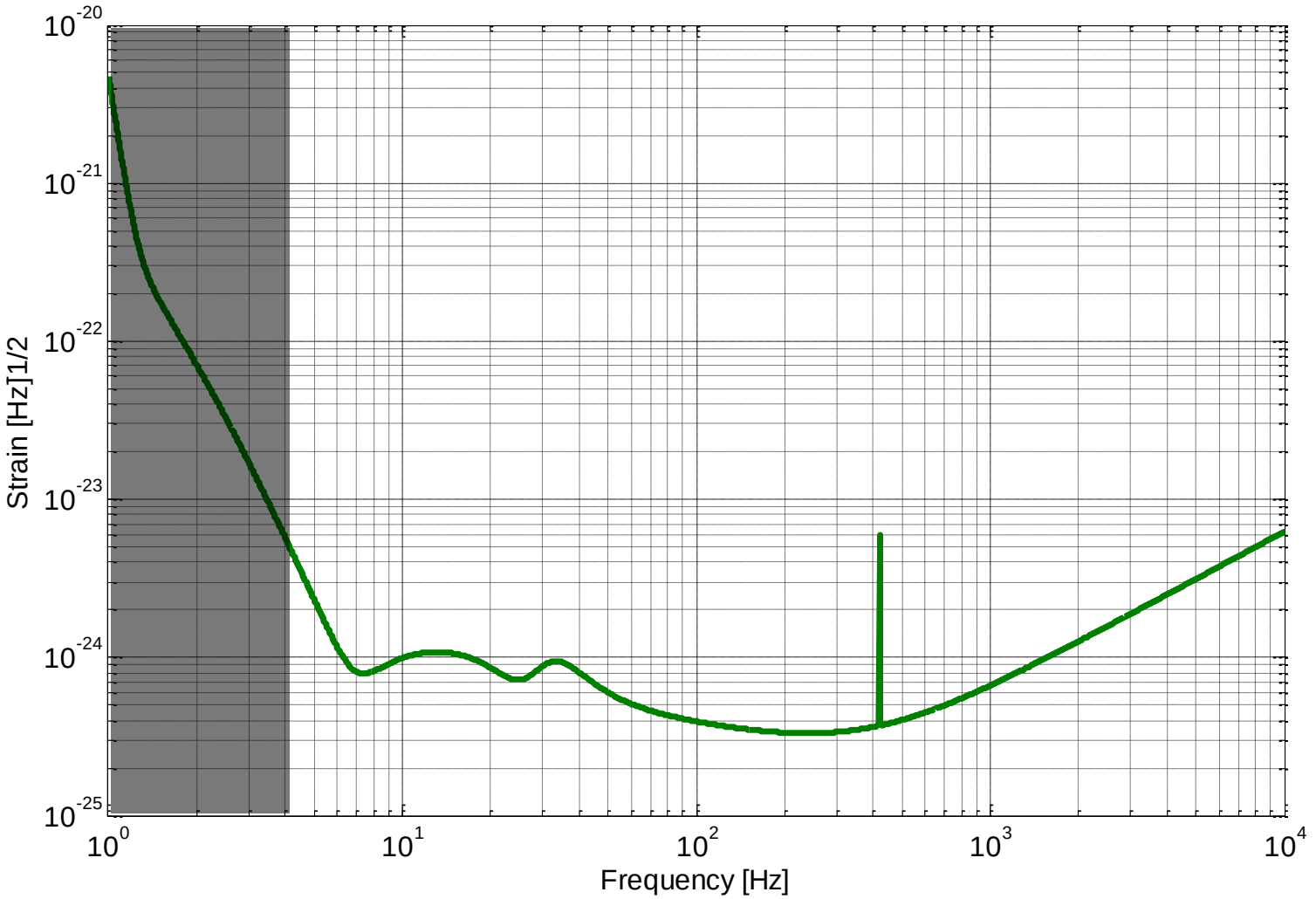
Noise contributions Xylophone



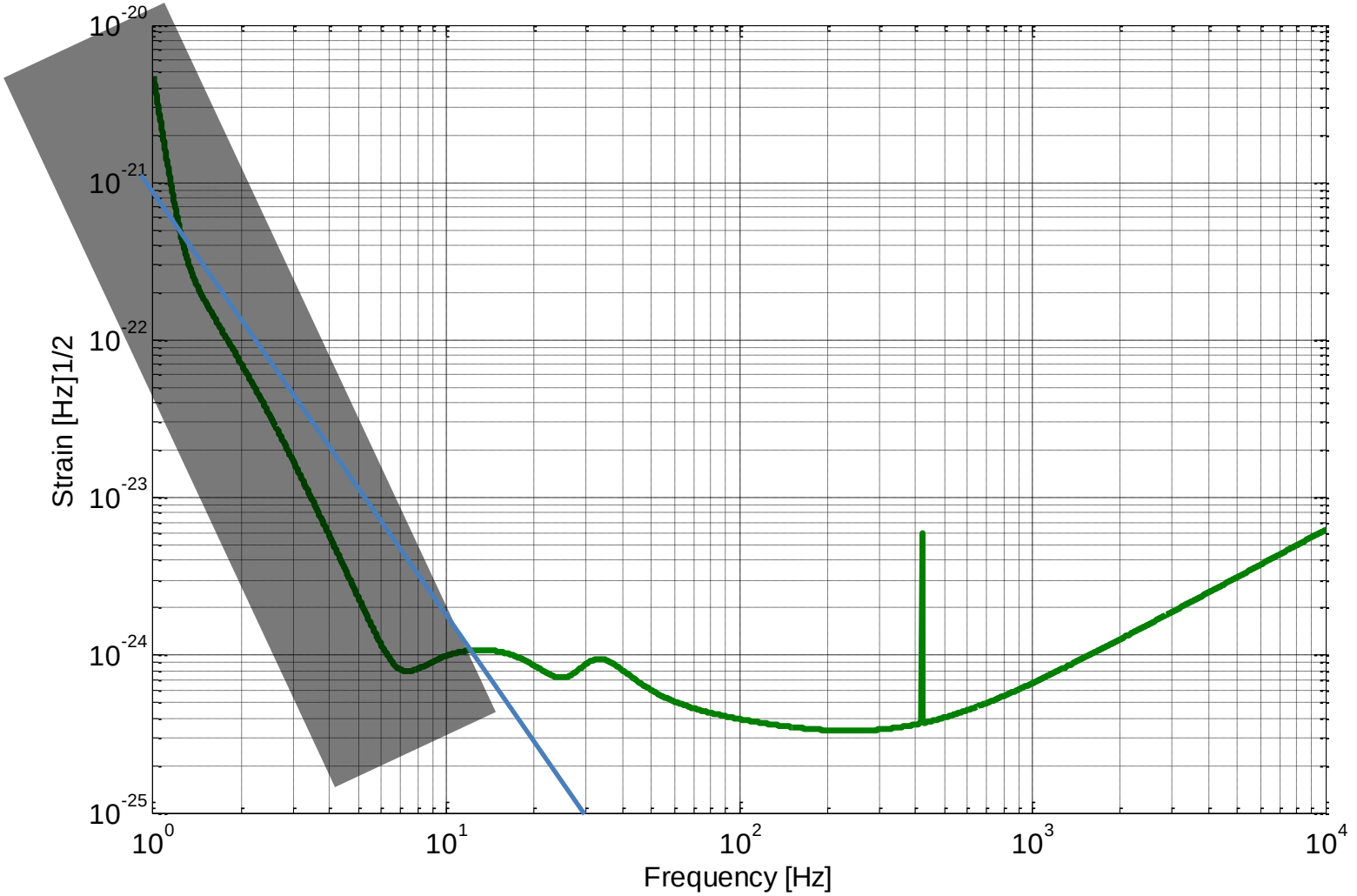
Combination of LF & HF curve



Combination of LF & HF curve



Combination of LF & HF curve



Xylophone Parameters

Parameter	ET-HF	ET-LF
Arm length	10 km	10 km
Input power (after IMC)	500 W	3 W
Arm power	3 MW	18 kW
Temperature	290 K	10 K
Mirror material	Fused Silica	Silicon
Mirror diameter / thickness	62 cm / 30 cm	62 cm / 30 cm
Mirror masses	200 kg	211 kg
Laser wavelength	1064 nm	1550 nm
SR-phase	tuned (0.0)	detuned (0.6)
SR transmittance	10 %	20 %
Quantum noise suppression	10 dB	10 dB
Beam shape	LG_{33}	TEM_{00}
Beam radius	7.25 cm	12 cm
Clipping loss	1.6 ppm	1.6 ppm
Suspension	Superattenuator	5×10 m
Seismic (for $f > 1$ Hz)	$1 \cdot 10^{-7}$ m/f^2	$5 \cdot 10^{-9}$ m/f^2
Gravity gradient subtraction	none	factor 50