



Einstein Telescope sensitivity curves used for CoBA Science study (ET-0291A-22)

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Stefan Danilishin and Teng Zhang for the Instrument Science Board (ISB)

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1 Description

This document contains the data vectors used for the production of sensitivity curves of Einstein Telescope configurations used in the Cost and Benefit Analysis (CoBA) Science study document [ET-0291A-22](#). Note that these sensitivity curves represent the ET collaboration’s state of knowledge of the sensitivity of the detector on the end of December 2021, whereas the current official noise budget of Einstein Telescope detectors (see [ET-0007B-23](#) for updated sensitivity curves¹) has been updated by the ISB in accordance with the ongoing R&D on the ET technical design.

The data is collected in three text files – `ET10kmcolumns.txt`, `ET15kmcolumns.txt` and `ET20kmcolumns.txt` — for each of the 3 considered length of the arms, *i.e.* for 10, 15 and 20 km respectively.

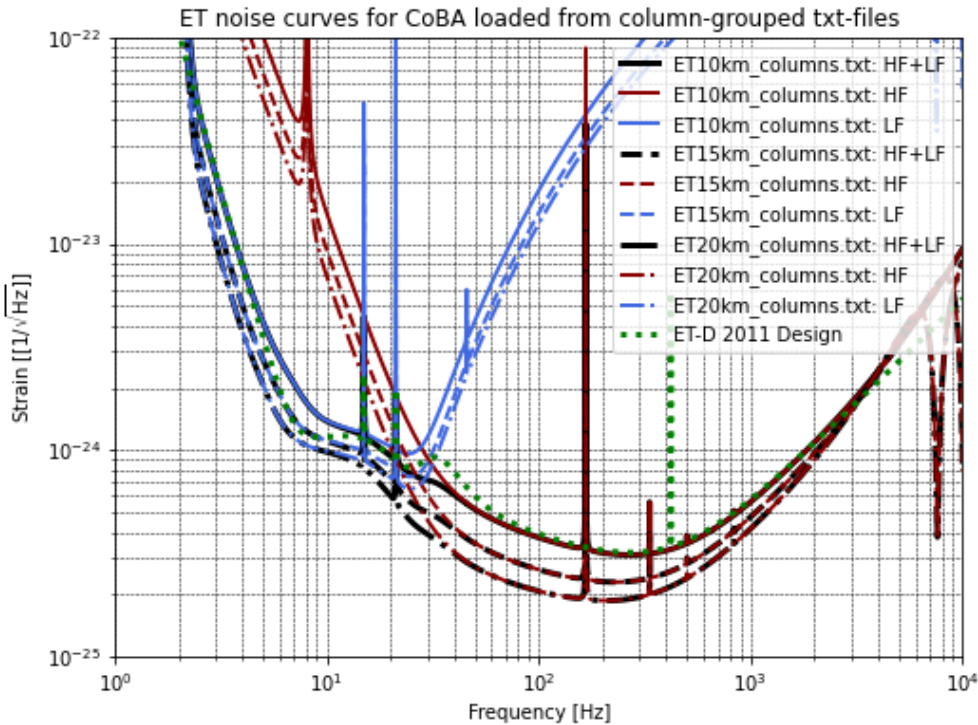


Figure 1: Sensitivity curves of the ET used in the CoBA Science Study document.

In each file, the first of the four columns is the logarithmic spaced frequency vector of 3000 points spanned from 1 Hz to 10 kHz. The rest of the three data columns contain the power spectral density (PSD) of the total noise (evaluated at the corresponding frequency) for the ET high-frequency room-temperature interferometer (ETHF), ET low-frequency cryogenic interferometer (ETLF), and for the combined xylophone configuration of one of the Einstein Telescope detectors (ET LF+HF), respectively.

Each PSD data vector corresponds to the strain sensitivity of a single L-shaped dual-recycled Fabry-Perot–Michelson interferometer with frequency-dependent squeezing injection.

The corresponding data vectors should produce sensitivity curves as shown in the Fig. 1.

¹Not public yet at the time of writing, but shall be made public in the next few months, tentatively by June-July 2023