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Impact of the Newtonian Noise on Einstein Telescope science

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Einstein Telescope will be the European third generation of gravitational wave detectors. It aims to increase the detectable capability of one order of magnitude in the frequency range of the interferometers of the second generation and enlarge the bandwidth down to a few Hertz. The main noise sources at low frequencies are seismic noise (important below a few Hz) and the Newtonian noise (NN) dominant below 10 Hz. In this work, we will present the contribution of the NN evaluated from the seismic noise of the two candidate sites (The Netherlands and Italy) and we will evaluate those impacts on the science for compact binary coalescence signals. We find that the effect of the signal to noise ratio of the main kind of gravitational waves is negligible for the Italian site while it is strongly affecting the Dutch site due to the different geology and anthropogenic noise present.

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