14th ICBEN 2023 18 - 22 JUNE BELGRADE

14th ICBEN Congress on Noise as a Public Health Problem

Binaural loudness summation of infrasound

Marion U. Bug[1], Melina Strüp[1], Torsten Marquardt[2]

[1] Physikalisch-Technische Bundesanstalt, Braunschweig, Germany
[2] UCL Ear Institute, University College London, London, United Kingdom

Corresponding author's e-mail address: marion.bug@ptb.de

ABSTRACT

Fundamental knowledge of the physiological processes involved in infrasound perception is essential to estimate and, finally, classify the potential annoyance generated by infrasound-containing noise. However, corresponding investigations are still scarce. As a step towards understanding binaural infrasound perception, this study investigated binaural loudness summation of several types of stimuli (pure tones with frequencies 8 Hz, 32 Hz and 400 Hz, amplitude-modulated signals and transposed tones) [1]. Hearing-threshold measurements (2-AFC experiments) and loudness-comparison experiments at a loudness level of 40 phon (maximum-likelihood-tracking 2-AFC) were performed with 16 test subjects. All stimuli were presented binaurally with different interaural phase differences (IPD) and compared to their monaural presentation. Literature values for binaural loudness summation of diotic stimuli were confirmed and extended towards the low-frequency range [2, 3]. In addition, a strong IPD dependence of the binaural loudness summation of infrasound was found, which will be discussed in detail in this conference presentation.

[1] M.U. Bug, M. Strüp, T. Marquardt. Dependence of binaural gain for infrasound on interaural phase difference. J. Acoust. Soc. Am. 2022; 152:163 1-10.

[2] B.C.J. Moore, B.R. Glasberg. Modeling binaural loudness. J. Acoust. Soc. Am. 2007; 121: 1604-1612.

[3] N.S. Yeowart, M.J. Evans. Thresholds of audibility for very low-frequency pure tones. J. Acoust. Soc. Am. 1974; 55: 814-818.

Keywords (3-6): infrasound, loudness summation, binaural hearing, interaural phase difference