

Psychoacoustics and spatial sound reproduction

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Spatial sound reproduction via loudspeakers has received heightened attention in recent years in the audio engineering community. There, the focus is to develop systems capable of reproducing sound with perceived spatial and timbral fidelity. The psychoacoustics community is likewise tending towards spatial techniques in the free field as they allow creating the listening situations with multiple distributed sound sources and reverberation that are difficult for hearing impaired listeners. However, the systems are there used for measurement purposes and should hence adhere to strict requirements on the accuracy and predictability of the received ear signals.

Starting from an overview of our real-time Simulated Open Field Environment (rtSOFE) to interactively simulate and auralize sound sources in rooms, I will discuss design choices made to accommodate the requirements of psychoacoustic research. I will present results from the technical evaluation of the system which foster ongoing development. The system's focus is on the accurate reproduction of moving sound sources, and I will present first results on how movement impacts masked thresholds. Besides simulating the sound in rooms, real sound fields can be captured with microphone arrays for reproduction. Issues with recording and reproducing sound scenes in higher order Ambisonics will be discussed.