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Effects of Low-frequency Absorption on Perceived Tightness of Bass Imagery in Music Reproduction

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In order to enable unbiased observation of the effects of low-frequency absorption on auditory imagery associated with multichannel loudspeaker reproduction, binaural recordings were made of surround sound program material that was reproduced over full-range loudspeakers located in a room that was specially constructed to allow for variation in low-frequency acoustical treatment. These recordings were then presented via headphones to allow for double-blind comparison of the variation in auditory imagery associated with selected changes in room acoustics while holding listener and loudspeaker locations constant. Several perceptual attributes were examined, but the listeners were able to make the most clear distinctions between auditory spatial images in terms of the attribute identified as the "perceived tightness of bass imagery." Analysis of the signals presented to the listeners' ears in these binaurally-reproduced multichannel music samples showed that the tightest bass imagery was associated with high values of interaural coherence, with lower values producing more "muddy" bass imagery. [Work supported by Canada Foundation for Innovation.]