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New measurements of head-related transfer functions with an optimized ear-canal microphone

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Affecting the ear-canal impedance by inserting a microphone produces considerable changes in the directional characteristics of the ear with increasing frequency. Head-related transfer functions (HRTFs) are measured in the horizontal and median plane under systematic change of the ear-canal microphone more or less blocking the ear-canal entrance. A microphone arrangement is developed which minimizes the influence on the given impedance of the ear canal entrance. New measurements of HRTFs are reported and compared with well-known literature results. The "undisturbed" HRTFs serve as objective functions for a microphone array which substitutes the dummy head in head-related (stereophonic) recordings. The (complex) objective functions are modified for the microphone array according to the relevance in directional hearing.