

Abstract Submitted
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Tympanic-response transition in ICE: Dependence upon the interaural cavity's shape¹ J. LEO VAN HEMMEN, Physik Department T35, TU Muenchen — More than half of the terrestrial vertebrates have internally coupled ears (ICE), where an interaural cavity of some shape acoustically couples the eardrums. Hence what the animal's auditory system perceives is not the outside stimulus but the superposition of outside and internal pressure on the two eardrums, resulting in so-called internal time and level difference, iTD and iLD, which are keys to sound localization. For a cylindrical shape, it is known that on the frequency axis two domains with appreciably increased iTD and iLD values occur, segregated by the eardrum's fundamental frequency. Here we analyze the case where, as in nature, two or more canals couple the eardrums so that, by opening one of the canals, the animal can switch from coupled to two independent ears. We analyze the iTD/iLD transition and its dependence upon the interaural cavity's size and shape. As compared to a single connection, the iTD performance is preserved to a large extent. Nonetheless, the price to pay for freedom of choice is a reduced frequency range with high-iTD plateau.

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