

## Limitations on the perception of interaural time differences in electric and acoustic hearing

**Bernhard Laback**, *Acoustics Research Institute, Austrian Academy of Sciences, Austria*

**Piotr Majdak**, *Acoustics Research Institute, Austrian Academy of Sciences, Austria*

**Wolf-Dieter Baumgartner**, *ENT-Department, Vienna University Hospital, Austria*

**Objectives:** Laback et al. (2005) and Majdak et al. (2005) showed that bilateral cochlear implant (CI) listeners lateralize stimuli based on interaural time differences (ITD) in the fine structure. For the “better performing” CI listeners, the highest pulse rate showing effects of fine structure ITD was comparable to that of normal hearing (NH) subjects listening to acoustic simulations of electric stimulation. This study attempted to verify that the performance of the NH listeners was not underestimated by a potentially unfavorable choice of the center frequency of the stimulus (4590 Hz) based on the following hypothesis: if the ringing of the auditory filters limits ITD perception at higher pulse rates, the maximum pulse rate showing significant effects of ITD will increase with increasing center frequency. **Methods:** Rectangularly gated pulse trains carrying ongoing ITD were bandpass filtered, simulating fine structure ITD in electric hearing. Lateralization discrimination was tested at different pulse rates (200 to 800 pulses per second) and center frequencies (4590, 6490, 9180 Hz). **Results:** The maximum pulse rates showing significant effects of ITD did not vary with center frequency. **Conclusions:** The auditory filters of NH listeners do not limit ITD perception for center frequencies down to 4590 Hz. Thus, the comparison between the results for the NH and CI listeners in the cited studies appears to be valid. **References:** Laback, B., Majdak, P., Baumgartner., W.D. (2005), 28th Midwinter Meeting of the Association for Research in Otolaryngology. Majdak, P., Laback, B., Baumgartner., W.D. (2005), 28th Midwinter Meeting of the Association for Research in Otolaryngology.