

## **Temporal fine structure and onset/offset cues in ITD-based lateralization of bilateral Cochlear Implant listeners**

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Several studies reported generally higher lateralization thresholds upon interaural time delay (ITD) of bilateral Cochlear Implant (CI) listeners compared to normal hearing (NH) listeners. In addition, the thresholds appear to increase much more rapidly with increasing stimulus (pulse) rate than in NH listeners [van Hoesel, R. J., and Tyler, R. S., J. Acoust. Soc. Am. 113, 1617-1630]. Up to now, it has not been directly proven that CI listeners are sensitive to ITD in the temporal fine structure and how this sensitivity relates to the sensitivity to ITD in the signal onset and offset. This study directly determined the relative importance of ITD in the temporal fine structure and in the onset and offset with bilateral CI listeners, applying an lateralization discrimination task. To exclude confounding effects of ILD in the onset/offset portions, a four-pulse stimulus was used, which allowed a strict separation between signal onset/offset and fine-structure. Conditions with ITD in the stimulus onset and/or offset only were tested to examine if the particular importance of ITD in the stimulus onset, as known from normal hearing [2], can also be found in CI listeners. All types of ITD were tested as a function of pulse rate, since the relative contribution of fine structure and gating delay is expected to depend on the pulse rate. Four of the five CI listeners tested up to now showed rather poor ITD sensitivity, making it impossible to discriminate between different measurement conditions. One CI listener, however, showed sensitivity to ITD in the temporal fine-structure up to 800 pulses per second, the highest rate tested. In accordance with NH listeners, the importance of the signal onset for ITD-based lateralization increases with pulse rate.