

ACOUSTICS2008/30
**Phase interactions between auditory filter and complex stimuli:
psychophysical evidence for level dependence in cochlear phase
response**

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Harmonic complexes with the same power spectrum and different phase spectra lead to significant differences in their efficiency in masking pure-tone signals. This process is presumably due to phase interactions between the masker and the cochlea, leading to internally represented waveforms with different amounts of modulation. The present study applied this idea to estimate the phase characteristic of the auditory system at different stimulus levels. Two masking experiments were conducted for estimating whether auditory-filter phase curvatures are level dependent at 2 and 4 kHz. Curvatures were measured at fixed masker levels ranging between 50 and 90 dB SPL in one experiment and at fixed signal levels (25 - 50 dB SPL) in a second experiment. Results from both experiments suggest a level dependence in the auditory-filter phase curvature at both frequencies, which shifts from a negative value towards zero with increasing excitation level. A plausible explanation for this observed level dependence was proposed with the use of a nonlinear cochlear model. This modeling approach indicated that the behaviorally measurable phase curvature is affected by level dependent alterations in the magnitude and phase response of the basilar membrane.