



EINLADUNG

zum Vortrag im Rahmen des Seminars des SFB/TRR 31

Freitag, 8. Januar 2010, 14 Uhr c.t.

im Raum G26.1 – 010
Rechenzentrum der Universität Magdeburg
und
im Raum W2 1-143, Universität Oldenburg
(per Videoübertragung)

“Mechanisms of monaural and binaural temporal processing towards spatial hearing”

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Among sensory systems, audition excels in its speed of processing. Psychophysical and neurophysiological correlates of this feature have been particularly well studied for sensitivity to interaural time differences. I will discuss the circuit in the mammalian brainstem that is thought to underlie this sensitivity.

The circuit first transduces the acoustic waveform into a temporal code in the cochlea and auditory nerve (AN), and enhances the temporal code in the bushy cells of the cochlear nucleus (CN), which converge from left and right sides onto coincidence detectors in the medial superior olive (MSO). Here, the temporal code is transformed into a rate code which is then relayed to higher structures such as the inferior colliculus (IC). Temporal delays are a critical feature of this circuit: external acoustic delays (ITDs) are compensated by "internal" delays in the central nervous system, so that the signals from the two ears reach MSO neurons coincidentally.

Our approach to this circuit is to devise broadband stimuli that reveal "pure" binaural temporal interactions, and to then compare the response of binaural neurons with responses of monaural neurons, via a coincidence analysis. I will point out difficulties with existing physiological binaural models and propose a new model.