Sonderforschungsbereich/Transregio 31
“Das aktive Gehör”

E I N L A D U N G

zum Vortrag im Rahmen des Seminars des SFB/TRR 31

Freitag, 27. Juni 2014, 14 Uhr c.t.

im Raum H28 / R 2.31 des Med. Campus Magdeburg
und Raum W2 1-143 der Universität Oldenburg
(per Videoübertragung)

"Computational Modeling of Tinnitus: Theory and Experimental Tests"

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The understanding of tinnitus has progressed considerably through animal models and human neuroimaging studies. It is now clear that tinnitus is generated through pathologically altered spontaneous activity of neurons in the central auditory system. However, the details of the mechanisms that give rise to these aberrant neuronal activity patterns have not yet been pinpointed.

In my talk, I will illustrate how we have used computational modelling to explore which mechanisms could give rise to putative neuronal correlates of tinnitus, showing that a model based on the principle of activity stabilization through homeostatic plasticity can account for the development of neuronal hyperactivity as observed in animal studies. Moreover, when applied to the audiograms of patients with noise-induced hearing loss and tonal tinnitus, the model predicts tinnitus frequencies close to the observed tinnitus pitch. The model thus proposes a specific mechanism for how plasticity in the central auditory system could lead to the development of tinnitus after cochlear damage. The homeostasis model can also account for recent experimental findings from tinnitus patients with normal audiograms and for electrophysiological results in a mouse model of "hidden hearing loss". Moreover, the model can explain why auditory deprivation through an earplug can lead to the occurrence of phantom sounds.