Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Learning tinnitus[1] J. LEO VAN HEMMEN, Physik Department, TU Munich — Tinnitus, implying the perception of sound without the presence of any acoustical stimulus, is a chronic and serious problem for about 2% of the human population. In many cases, tinnitus is a pitch-like sensation associated with a hearing loss that confines the tinnitus frequency to an interval of the tonotopic axis. Even in patients with a normal audiogram the presence of tinnitus may be associated with damage of hair-cell function in this interval. It has been suggested that homeostatic regulation and, hence, increase of activity leads to the emergence of tinnitus. For patients with hearing loss, we present spike-timing-dependent Hebbian plasticity (STDP) in conjunction with homeostasis as a mechanism for "learning" tinnitus in a realistic neuronal network with tonotopically arranged synaptic excitation and inhibition. In so doing we use both dynamical scaling of the synaptic strengths and altering the resting potential of the cells. The corresponding simulations are robust to parameter changes. Understanding the mechanisms of tinnitus induction, such as here, may help improving therapy.

[1]Work done in collaboration with Julie Goulet and Michael Schneider. JLvH has been supported partially by BCCN – Munich.

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Date submitted: 05 Nov 2015 Electronic form version 1.4