

Abstract Submitted  
for the MAR08 Meeting of  
The American Physical Society

**Inhibition is Needed to Learn Precise Multimodal Integration<sup>1</sup>**

J. LEO VAN HEMMEN, Physik Department, TU Munich — Multimodal neuronal maps, combining input from two or more sensory systems, e.g., vision and audition, play a key role in processing and transforming sensory to motor information. For such maps to be of any use, the input from all participating modalities must be calibrated so that a stimulus at a specific spatial location is represented at an unambiguous position in the multimodal map. Here we discuss a method based on supervised spike-timing-dependent plasticity (STDP) to gauge input from different sensory modalities so as to ensure proper map alignment. We therefore analyze *excitation-* and *inhibition-mediated learning* in conjunction with the problem of how perfect a teacher should be. Analytical calculations and numerical simulations show on the one hand that inhibitory teacher input is essential if high-quality multimodal integration must be learnt rapidly. On the other hand, the quality of the resulting map is not limited by the quality of the teacher signal alone but rather by the accuracy of the input from other sensory modalities.

<sup>1</sup>Work done in collaboration with P. Friedel, A.B. Sichert, and C. Vossen. Supported by BCCN Munich & DFG (HE 3252/1-4)

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Date submitted: 26 Nov 2007

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