Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Congruent and Opposite Neurons as Partners in Multisensory Integration and Segregation[1] WEN-HAO ZHANG, K. Y. MICHAEL WONG, HE WANG, Hong Kong University of Science and Technology, SI WU, Beijing Normal University — Experiments revealed that where visual and vestibular cues are integrated to infer heading direction in the brain, there are two types of neurons with roughly the same number. Respectively, congruent and opposite cells respond similarly and oppositely to visual and vestibular cues. Congruent neurons are known to be responsible for cue integration, but the computational role of opposite neurons remains largely unknown. We propose that opposite neurons may serve to encode the disparity information between cues necessary for multisensory segregation. We build a computational model composed of two reciprocally coupled modules, each consisting of groups of congruent and opposite neurons. Our model reproduces the characteristics of congruent and opposite neurons, and demonstrates that in each module, congruent and opposite neurons can jointly achieve optimal multisensory information integration and segregation. This study sheds light on our understanding of how the brain implements optimal multisensory integration and segregation concurrently in a distributed manner.

[1]This work is supported by the Research Grants Council of Hong Kong (N_HKUST606/12, 605813, and 16322616) and National Basic Research Program of China (2014CB846101) and the Natural Science Foundation of China (31261160495).

K. Y. Michael Wong
Hong Kong University of Science and Technology

Date submitted: 11 Nov 2016 Electronic form version 1.4