Joint CQSE and CASTS Seminar

Weekly Seminar
Nov. 6, 2015 (Friday)

TIME Nov. 6, 2015, 14:30 ~ 15:30
TITLE Adaptive Systems with Functional Dynamics: Omitted-Stimulus Responses in Biological Systems
SPEAKER Dr. Chun-Chung Chen
Institute of Physics, Academia Sinica
PLACE Rm716, CCMS & New Physics Building, NTU

Abstract

Many biological systems can sense periodical variations in a stimulus input and produce well-timed, anticipatory responses after the input is removed. This functional behavior can be used by the organisms to facilitate their survival. However, such effects for extracting and retaining timing information in stimulus cannot be understood from traditional synchronization consideration of passive oscillatory systems. For this, we consider oscillators built from excitable systems with additional adaptive dynamics. With such, well-timed post-stimulus responses similar to experimental observations can be obtained. Similar anticipatory dynamics if also found in a well-known model of working memory where the adaptive mechanism is identified with synaptic facilitation. The finding suggests that this type of oscillator can be common in neuronal systems with plasticity.