Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

A Hierarchy of Dynamic Equilibria and a View of a Fly's Equilibrium Reflex Z. JANE WANG[1], Cornell University — Understanding structures within a structure is a topic that has fascinated Leo throughout his life, and we are now benefiting from his fundamental insights when we think about living organisms. A living organism is far from statistical equilibrium and it does not have a single critical parameter. Nevertheless, each organism has a hierarchical structure within itself. Recently, asking how often a fly must sense its orientation in order to balance in air has led us to suggest one of the fly's 17 steering muscles, the first basalar muscle, is responsible for maintaining flight stability. Here I suggest that the chain of events associated with flight equilibrium reflex can be viewed as a succession of local linear transformation about a set of dynamic equilibria[1]. Each of the functionally different parts, the sensors, motor neurons, muscles, wing-hinges, flapping wings, and the thorax, operates near its own dynamic equilibrium, often close to the boundary between stability and instability. Locomotion rises as an organism responds to a small perturbation from these equilibria. [1] ZJ Wang, Ann. Rev. Cond. Matter Physics, Vol 7, 2016

[1]Kadanoff session

Z. Jane Wang
Cornell University

Date submitted: 05 Jan 2016 Electronic form version 1.4