1067-92-1236 **Hassan M Fathallah-Shaykh*** (hfathall@uab.edu), FOT 1020, 1530 3rd Avenue South, Birmingham, AL 35294-3410. *Dynamics Of The Drosophila Circadian Clock: Theoretical Anti-Jitter Network And Controlled Chaos.*

Electronic clocks exhibit undesirable jitter or time variations in periodic signals. The circadian clocks of humans, some animals, and plants consist of oscillating molecular networks with peak-to-peak time of approximately 24 hours. Clockwork orange (CWO) is a transcriptional repressor of Drosophila direct target genes. Theory and data from a model of the Drosophila circadian clock support the idea that CWO controls anti-jitter negative circuits that stabilize peak-to-peak time in light-dark cycles (LD). The orbit is confined to chaotic attractors in both LD and dark cycles and is almost periodic in LD; furthermore, CWO diminishes the Euclidean dimension of the chaotic attractor in LD. Light resets the clock each day by restricting each molecular peak to the proximity of a prescribed time. The theoretical results suggest that chaos plays a central role in the dynamics of the Drosophila circadian clock and that a single molecule, CWO, may sense jitter and repress it by its negative loops. (Received September 20, 2010)