Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Morphogenic asymmetries in tissue dynamics XOMALIN G. PERALTA, Y. TOYAMA, Department of Physics, R. MONTAGUE, Department of Biology, S. VENAKIDES, Department of Mathematics, D.P. KIEHART, Department of Biology, G.S. EDWARDS, Department of Physics, Duke University — Structural and kinematic symmetries in living organisms arise from the forces responsible for tissue movements during development. Tissue dynamics during dorsal closure, a stage of *Drosophila* development, provide a model system for cell sheet morphogenesis. It is characterized by tissue movements, driven by four biological processes which are coordinated in space and synchronized in time. Quantifying morphogenic asymmetries is essential for understanding the spatial and temporal differences in the contributing processes, the extent to which they can vary and still result in successful closure. They also provide a basis for understanding dynamic changes that occur to compensate for perturbations. We measured spatial, kinematic and dynamic asymmetries to biophysically characterize natural asymmetries in unperturbed closure, resiliency to laser perturbations and failure of closure in some mutant embryos. We found an asymmetric upregulation of a biological process in response to laser perturbations. In the mutants, there is a reversed asymmetry. Supported by NIH (GM33830 and GM61240).

Xomalin G. Peralta
Department of Physics, Duke University

Date submitted: 22 Nov 2006 Electronic form version 1.4