Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Axonal Transport and Morphogenesis near Retinal Excavation of the eye[1] YINYUN LI, Department of Physics and Astronomy, Ohio University, ANTHONY BROWN, Center for Molecular Neurobiology and Department of Neuroscience, Ohio State University, PETER JUNG, Department of Physics and Astronomy, Ohio University — Neurofilaments(NFs) represent the main space-filling elements of mature axons. NFs are transported on microtubule (MT) tracks along the axon at a slow rate of mm/day and thus form a dynamic cytoskeleton. During development, the optic nerve forms a sharp increase of caliber at about $150\mu m$ from the retinal excavation of the eye. Our key hypothesis is a relation between NF kinetics and nerve morphology based on the continuity of the active flow of NFs. We use computational modeling of axonal transport to infer modulation of NF kinetics consistent with the observed increase of nerve caliber. We show that the inferred kinetics is also consistent with reported spatial distribution of NFs and MTs near the retinal excavation. We further show that the predicted time course of development of the observed nerve swelling is consistent with the time course of animal development.

[1]This work has been sponsored by NSF under grants IOS-0818412(PJ) and IOS-0818653(AB)

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Date submitted: 27 Dec 2010 Electronic form version 1.4