

Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Modeling motor-driven cargo transport in cytoskeletal networks¹

KEVIN CHING, SUPRAVAT DEY, MOUMITA DAS, Rochester Inst of Tech — Intracellular transport of organelles, vesicles, and other cargo by molecular motors is essential to proper functioning of cells. Most models of cargo transport have focused on the dilute limit of a single motor moving along a single filament. In cells, however, motors transporting cargos have to navigate crowded, space filling networks. Furthermore, cargos are rarely carried by a single motor, and motor-motor interactions may occur during collective transport of cargos. Motivated by this, we mathematically model the transport of cargo motor complex in filamentous networks, using a combination of analytical calculations and numerical simulations. We study cargo MSDs, and velocities as functions of mechanical properties of the cargo and the network, as well as motor density, and motor-motor interactions. Our results may help to understand how multiple motors transport large cargos in the cytoskeletal network.

¹This work was supported by a grant from the Moore Foundation.

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Date submitted: 07 Nov 2016

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