Bidirectionality from Cargo Thermal Fluctuations in Motor-Mediated Transport

Christopher E. Miles, James P. Keener

PII: S0022-5193(17)30202-3
DOI: 10.1016/j.jtbi.2017.04.032
Reference: YJTBI 9057

To appear in: *Journal of Theoretical Biology*

Received date: 10 December 2016
Revised date: 26 April 2017
Accepted date: 29 April 2017

Please cite this article as: Christopher E. Miles, James P. Keener, Bidirectionality from Cargo Thermal Fluctuations in Motor-Mediated Transport, *Journal of Theoretical Biology* (2017), doi: 10.1016/j.jtbi.2017.04.032

Highlights

- A mean-field model of motor-mediated transport highlighting cargo diffusion is proposed
- Analysis provides a novel heuristic approximation of delayed motor response to cargo fluctuations
- Model is reduced to a "characteristic distance", a proxy for the mean instantaneous cargo velocity
- Cargo diffusion alone is a sufficient noise source to drive switching
- Computation of the switching time agrees with experiments provides additional predictions