The 958th IMS colloquium
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Dynamic and thermodynamic performance bounds for collective motor-driven transport

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Simon Fraser University

Date & Time: 2022/8/1 (Mon.) 16:00-17:30
Place: ~~IMS Research Building Room 201~~
Zoom開催に変更しました。
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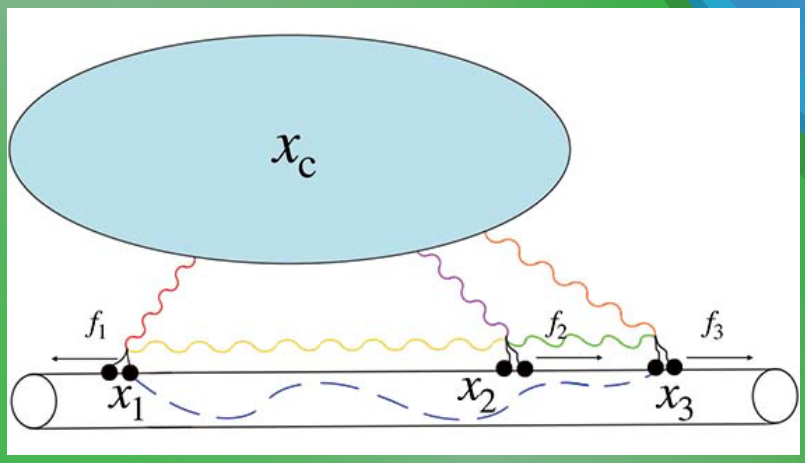

Motor-driven intracellular transport of organelles, vesicles, and other molecular cargo is a highly collective process. An individual cargo is often pulled by a team of molecular motors, with numbers ranging from only a few to several hundred. Using stochastic thermodynamics, we derive a series of bounds that constrain the performance (including velocity, precision, and efficiency) of a broad class of these collective-transport systems for arbitrary number of motors. We then explore an analytically tractable model that gives simple functional forms for the performance metrics and exactly saturates the derived bounds. The resulting trade-offs with varying motor number point to design principles governing functional collections of transport motors in different contexts.

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（IMS colloquium FY2022 committee）