



MACS セミナー

SG⑤ 「自然科学における統計サンプリングとモデリング：数理から実践まで」

Motoring Along Filamentous Tracks: Rules, Regulations and Control of Traffic in Living Cells

Date & Time : **16:00-18:00 on Friday, September 21, 2018**

Venue : **Room 106 (BP1), Faculty of Science Bldg. #1**



Speaker :

Prof. Debashish Chowdhury

Indian Institute of Technology, Kanpur

(JSPS Invitational Fellow at the University of Tokyo)

Chowdhury 氏は、統計物理、生物物理などの広範な問題を対象とした理論物理学者で特に交通流の物理学で著名な研究をされています。交通流の問題はフィラメント上のモータータンパク質の問題にも展開されています。

Abstract :

Molecular motors are macromolecular complexes that move unidirectionally, on the average, along respective filamentous tracks in a step-by-step manner. However, the stepping of a motor is intrinsically stochastic.

Often many motors move along a single filament performing the same biological function and their collective movement, at least superficially, resembles vehicular traffic. Totally Asymmetric Simple Exclusion Process (TASEP) is one of the simplest models of nonequilibrium systems of self-propelled interacting particles. In the last 25 years it has served as the minimal model of vehicular traffic. In recent years

various extensions of TASEP have found interesting applications in theoretical modeling of traffic-like collective phenomena in biological systems. The results of our TASEP-based models provide insight into the mechanisms through which living cells regulate and control molecular motor traffic.

I'll present some of our recent works which address fundamental questions on the rules of molecular motor traffic from the perspective of interdisciplinary research that involves statistical physics, physical chemistry, Molecular cell biology, operations research and traffic engineering.



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