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場所：理学研究科合同B棟721号室

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題目：Structural relaxations, energy dissipations, and effective temperature in active cytoplasm

概要：

In living cells, various mechano-enzymes (e.g. motor proteins) perform their physiological roles using mechanical energy derived from metabolism. In highly crowded and condensed cell interiors, cytoplasm and cytoskeletons (the two key factors that determine cell mechanics) highly nonlinearly respond to the microscopic force generations. Eventually, the mechanical energy dissipates into cytoplasm via microscopic structural relaxations that are driven stochastically by motor-generated forces and induce vigorous cytoplasmic flows and fluctuations.

In this preliminary study, the non-equilibrium mechanics in living cells are investigated, in relation to nonequilibrium energetics, with microrheology technique. We discuss that effective temperature can describe the slow dynamics in cells at time scales longer than terminal relaxations, where both thermal and non-thermal fluctuations lose correlations. We propose a simple yet quantitative theory that allows us to deduce energy dissipations required for the structural relaxations.

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