



אוניברסיטת בן-גוריון בנגב
Ben-Gurion University of the Negev
Avram and Stella Goldstein-Goren Department
of Biotechnology Engineering
SEMINAR



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June 30, 14:10, Building 51 – Auditorium Nano

Cytoskeletal dynamics generate active liquid-liquid phase separation.

Liquid-Liquid phase separation (LLPS) has been of fundamental importance in the assembly of thermally driven materials and has recently emerged as an organizational principle for living systems. Biological phase separation is driven out of equilibrium through complex enzyme composition, chemical reactions, and mechanical activity, which reveals a gap in our understanding of this fundamental phenomenon. Here we study the impact of mechanical activity on LLPS. We design a DNA-based LLPS system coupled to flows through molecular motors and a cytoskeleton network. Active stress at an interface of a liquid droplet suppressed phase separation and stabilized a single-phase regime well beyond the equilibrium binodal curve. The phase diagram out of equilibrium revealed a 3-dimensional phase space that depends on temperature and local molecular activity. Similar dynamics and structures are observed in simulations, suggesting that suppression of liquid phase separation by active stress is a generic feature of liquid phase separation.

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