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**State transitions of actin cortices in vitro and in vivo** TZER HAN TAN, Massachusetts Inst of Tech-MIT, KINNERET KEREN, Technion-Israel Institute of Technology, FRED MACKINTOSH, University of Amsterdam, CHRISTOPH SCHMIDT, Goettingen University, NIKTA FAKHRI, Massachusetts Inst of Tech-MIT — Most animal cells are enveloped by a thin layer of actin cortex which governs the cell mechanics. A functional cortex must be rigid to provide mechanical support while being flexible to allow for rapid restructuring events such as cell division. To satisfy these requirements, the actin cortex is highly dynamic with fast actin turnover and myosin-driven contractility. The regulatory mechanism responsible for the transition between a mechanically stable state and a restructuring state is not well understood. Here, we develop a technique to map the dynamics of reconstituted actin cortices in emulsion droplets using IR fluorescent single-walled carbon nanotubes (SWNTs). By increasing crosslinker concentration, we find that a homogeneous cortex transitions to an intermediate state with broken rotational symmetry and a globally contractile state which further breaks translational symmetry. We apply this new dynamic mapping technique to cortices of live starfish oocytes in various developmental stages. To identify the regulatory mechanism for steady state transitions, we subject the oocytes to actin and myosin disrupting drugs.

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