MAR14-2014-020874

Abstract for an Invited Paper
for the MAR14 Meeting of
the American Physical Society

**Dynamics of active actin networks**

SIMONE KOEHLER, UC Berkeley

Local mechanical and structural properties of a eukaryotic cell are determined by its cytoskeleton. To adapt to their environment, cells rely on constant self-organized rearrangement processes of their actin cytoskeleton. To shed light on the principles underlying these dynamic self-organization processes we investigate a minimal reconstituted active system consisting of actin filaments, crosslinking molecules and molecular motor filaments. Using quantitative fluorescence microscopy and image analysis, we show, that these minimal model systems exhibit a generic structure formation mechanism. The competition between force generation by molecular motors and the stabilization of the network by crosslinking proteins results in a highly dynamic reorganization process which is characterized by anomalous transport dynamics with a superdiffusive behavior also found in intracellular dynamics. *In vitro*, these dynamics are governed by chemical and physical parameters that alter the balance of motor and crosslinking proteins, such as pH. These findings can be expected to have broad implications in our understanding of cytoskeletal regulation *in vivo*.