

MAR12-2011-005917

Abstract for an Invited Paper
for the MAR12 Meeting of
the American Physical Society

From filamentous bundles to active random flows

ZVONIMIR DOGIC, Department of Physics, Brandeis University, Waltham MA, USA

The cytoskeleton has a number of highly unusual material properties which are essential for the reproduction and survival of the cell. However, the extraordinary structural complexity of the cytoskeleton, which contains hundreds of different proteins, presents a particular challenge to any study of its material properties. I will outline experiments whose goal is to reconstitute certain material properties of the cytoskeleton using a few well-defined biochemical components. The long term goal is to understand the behavior of the resulting materials at all levels of hierarchy. For this reason, I will first describe experiments that probe the behavior of equilibrium filamentous bundles and their dependence on the properties of the constituent filaments and their interactions. Subsequently, I will describe the emergent dynamical patterns that form when molecular motors drive an assembly of filamentous bundles to highly out of equilibrium steady states.