Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Casimir interactions between crosslinkers in semiflexible networks DEVIN KACHAN, ROBIJN BRUINSMA, ALEX LEVINE, University of California, Los Angeles — The equilibrium phase behavior of solutions of semiflexible filaments such as F-actin and cross-linking proteins is complex. As a function of both crosslinker density and the preferred filament crossing angle imposed by the cross-linker, one may observe a plethora of complex ordered phases in addition to bundles. Simulations report both the formation lamellar network structures and the aggregation of cross-linkers in thermal equilibrium. These complex phases result from an effective interaction between cross-linkers mediated by the filaments to which they are bound. In this talk, we explore interactions between labile crosslinking proteins bound to semiflexible filaments mediated by the effect of crosslinking on the thermal fluctuation spectrum the filaments involved. Such fluctuation induced interactions are of the Casimir type, which we study using a path integral formulation of the partition function of the crosslinked filaments. We also make predictions for the spatial organization of crosslinkers along semiflexible filaments and in complex semiflexible networks based on this Casimir interaction.

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Date submitted: 09 Nov 2012 Electronic form version 1.4