Entropic force acting on a flat wall by a grafted F-actin

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Actin filaments have a significant impact on the deformation of the cell membrane [1]. In the cell cortex, some of the barbed ends of F-actins polymerize, whereas their pointed ends are attached to the cortex gel. The region beneath the membrane, where these filaments have thermal fluctuation is called the semiflexible region (SR) [2]. In SR, the fluctuating F-actins exert force on the membrane. We study the force acting on a flat wall by a grafted F-actin using an MD simulation. We focus on the distribution and magnitude of the entropic force exerted by the grafted F-actin on the different regions of the wall. Our results demonstrate that the filament's tip has a radial distribution. Moreover, we study effects of the increasing of the compression on the radial distribution of the filament's tip and the amount of the entropic force. The scale of the entropic force is about pN, which is in good agreement with experimental data.

[1] J. Howard, *Mechanics of Motor Proteins and the Cytoskeleton* (Sinauer Assoc., Sunderland, MA, 2001).

[2] A. Atakhani, F. Mohammad-Rafiee, A. Gholami, PLoS One **14**, e0213810 (2019).