

Abstract Submitted
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Wall Depletion Length of a Channel-Confined Polymer GUO KANG CHEONG, XIAOLAN LI, KEVIN DORFMAN, Univ of Minnesota - Twin Cities — The use of DNA has been prevalent in studying channel-confined polymers. Commonly, the assumption of a wall depletion length is used to bring correspondence between experimental systems (a polyelectrolyte in a charged channel) to theoretical models (a neutral polymer in a hard wall). We tested this assumption by using pruned-enriched Rosenbluth method (PERM) to simulate a confined DNA in a tube. We used a two parameter, exponentially decaying, repulsive potential to model the polymer-wall electrostatics interaction. We are interested, in particular, on where this assumption breaks down and its implication on experimental studies under a low ionic strength. We have found that the depletion length for the confinement free energy differ from those of mean span while it is still an extensive property of the channel size. Conversely, the depletion length from mean span is tantamount to the depletion length from variance about the mean span through all channel sizes.

Guo Kang Cheong
Univ of Minnesota - Twin Cities

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