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Some aspects of polymer translocation dynamics through nanopore: comparison of recent the-
ories with simulation results

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Translocation of a flexible polymer chain through a narrow pore has still remained an active field of research. Earlier theoretical
studies of Sung and Park, Muthukumar, Chuang, Kantor and Kardar, Kantor and Kardar for a flexible chain have been
complemented by more recent theories of Sakaue where tension propagation (TP) along the chain backbone at the cis side
resulting in a nonuniform stretching of the chain has been proposed to be a key input for theoretical studies. Recently these
elements of the TP theory has been incorporated in to a Brownian dynamics (BDTP) scheme and numerical studies of the
equations of motion are in excellent agreement with prior simulation studies. A driven translocating chain is essentially
out-of-equilibrium which results in cis-trans asymmetries both in conformations and in dynamics. Therefore, results from
theoretical studies should capture these features. In this talk first I will first present results from Langevin dynamics
simulation citing several cases where how this cis-trans asymmetry affects the chain conformations and the translocation
dynamics. Then I will discuss relevance of these results in the context of existing theories.

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