



Canadian Association
of Physicists

Association canadienne
des physiciens et physiciennes

Contribution ID: 490

Type: Oral (Non-Student) / Orale (non-étudiant(e))

Ratcheting charged polymers through nanopores: Designing a low pass molecular filter for DNA

Wednesday 9 June 2021 16:10 (5 minutes)

When nanopores are used to capture and translocate DNA molecules through a wall or membrane, the resulting capture rate is essentially independent of their molecular size, making the process incapable of changing relative concentrations in a mixture. Using Langevin Dynamics simulations, we show that it is possible to use pulsed fields to ratchet captured semiflexible molecules so that only short chains successfully translocate, thus transforming translocation into a low pass molecular filter. Two different modes of operation are investigated. One of these modes allow for the ratchet to be run with many pores in parallel, which increases its potential usefulness.

Authors: SLATER, Gary W. (University of Ottawa); QIAO, Le (University of Ottawa)

Presenter: SLATER, Gary W. (University of Ottawa)

Session Classification: W3-4 Molecular and Cellular Biophysics (DPMB) / Biophysique moléculaire et biophysique cellulaire (DPMB)

Track Classification: Physics in Medicine and Biology / Physique en médecine et en biologie (DPMB-DPMB)