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Towards measurements on intramolecular velocity fluctuations during DNA transport through nanopores

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Despite considerable technical progress in recent years, DNA sequencing is still a time and resource consuming procedure. Finding inexpensive, easy, and reliable alternative DNA sequencing strategies is a tall task. As recently demonstrated on biological pores, a promising approach to this challenge is the use of nanopores to characterize single strands of DNA. The advantages of nanopore technology for the characterization of DNA are manifold. The ability to directly interrogate single molecules electrically in the nanopore makes this approach very competitive over conventional DNA sequencing techniques, by sample preparation, reducing cost, and enabling point-of-need sequencing. However before solid-state nanopore devices can also be used to sequence DNA some challenges need to be overcome. The transport dynamics of DNA through solid-state nanopores have been intensively studied for a few years but the control of motion and speed proves to be very difficult on solid-state devices. In this poster, branched DNA molecules specifically designed to measure intramolecular translocation velocities of DNA polymers through solid-state nanopores fabricated by controlled breakdown (CBD) will be described. Finally, preliminary results of the building blocks of these branched DNA molecules will be presented. The ultimate goal is to develop a better understanding of the kinetics of DNA transport in these pores, which is one of the crucial steps towards implementing solid-state nanopore based DNA sequencing.

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