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Solid-state nanopore studies of hybridized DNA oligomers[1]
VENKAT BALAGURUSAMY, PAUL WEINGER, SUNGCHEOL KIM, XINSHENG SEAN LING, Brown University — Hybridization-assisted nanopore sequencing (HANS) uses short oligomers of DNA bound to a long single-stranded DNA in order to obtain the positional information of the bases that make up the long DNA molecule. To test the feasibility of the HANS approach, we carried out experiments to detect 12-base hybridizations in a tri-mer complex consisting of three single-stranded oligos hybridized at their ends sequenctially. These DNA complexes are connected to polystyrene beads through biotin-streptavidin bonds to enable their detection by nanopores. The experiment is to measure the time dependence of the nanopore ionic current at fixed voltage when the *cis* side is filled with the oligo-attached beads. Computer simulations are used as guides in the identification of translocation dynamics. Distinct features are found that can be attributed to tri-mers, dimmers, and monomers attached to the beads. The measured mean-first-passage time between two hybridization segments is extracted and is found to be consistent with theoretical estimates.

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