

Supplementary Information for:

Distinguishable Populations Report on Interactions of Single DNA Molecules with Solid-State Nanopores

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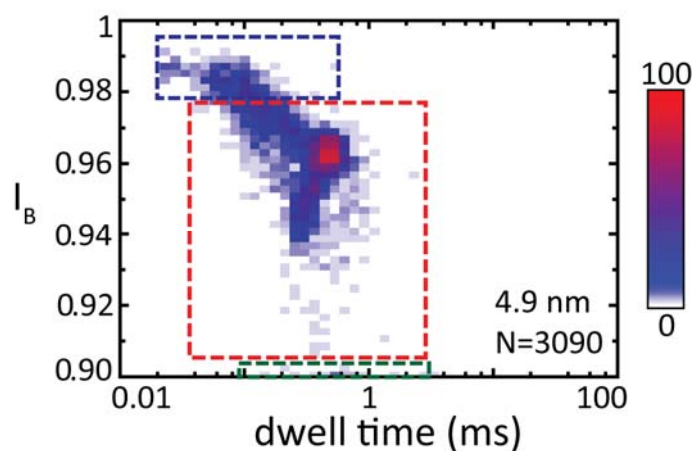


Figure S1. 2D-Histogram of I_B versus dwell time of the same nanopore as was used in Figure 3f. The dotted squares indicate the different event populations (**O**-events: blue, **H**-events: red, **L**-events: green). A longer DNA (48 kbp) and a zoomed-in vertical scale were employed, demonstrating that **O**- and **H**-events can be distinguished even in relatively large nanopores, such as this 4.9 nm diameter pore.

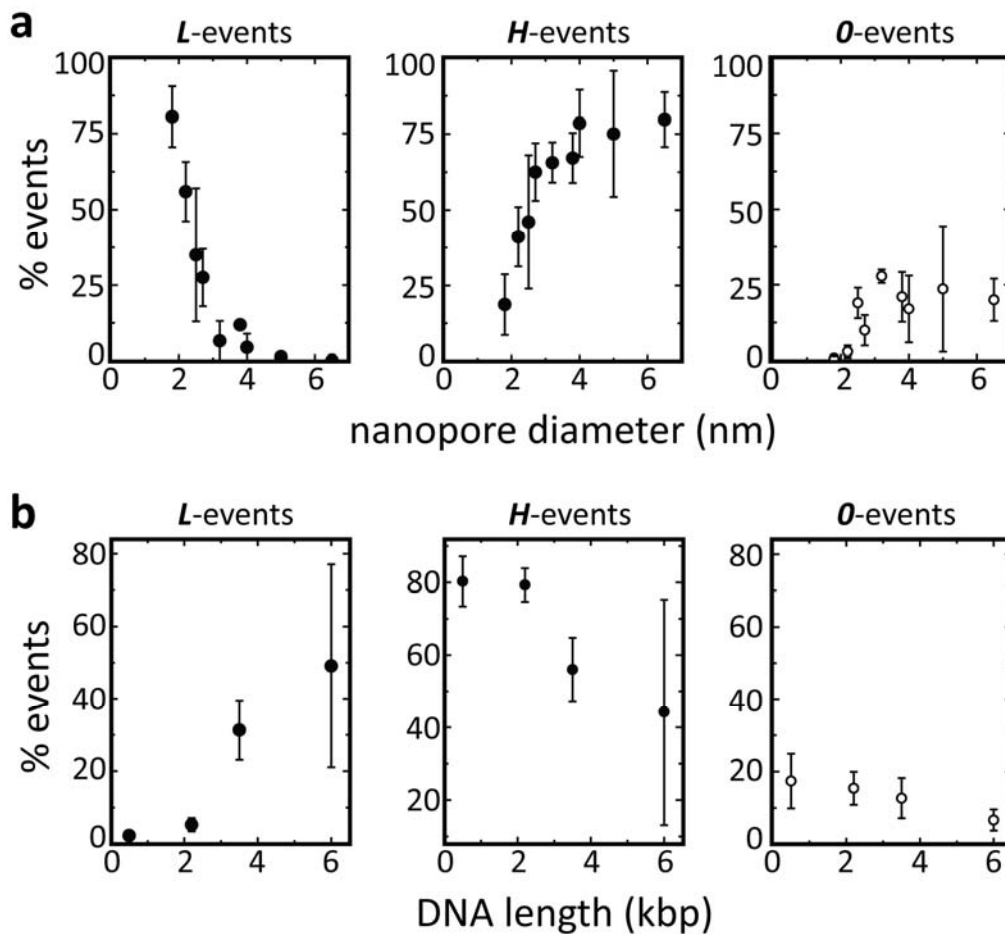


Figure S2. Plots of the percentages of *L*-, *H*-, and *O*-events accompanying the graphs shown in Figure 4. **a.** Percentages of *L*-, *H*-, and *O*-events for different nanopore diameters ranging from 1.8 nm to 6.5 nm. **b.** Percentages of *L*-, *H*-, and *O*-events for different DNA lengths ranging from 0.5 kbp to 6.0 kbp.

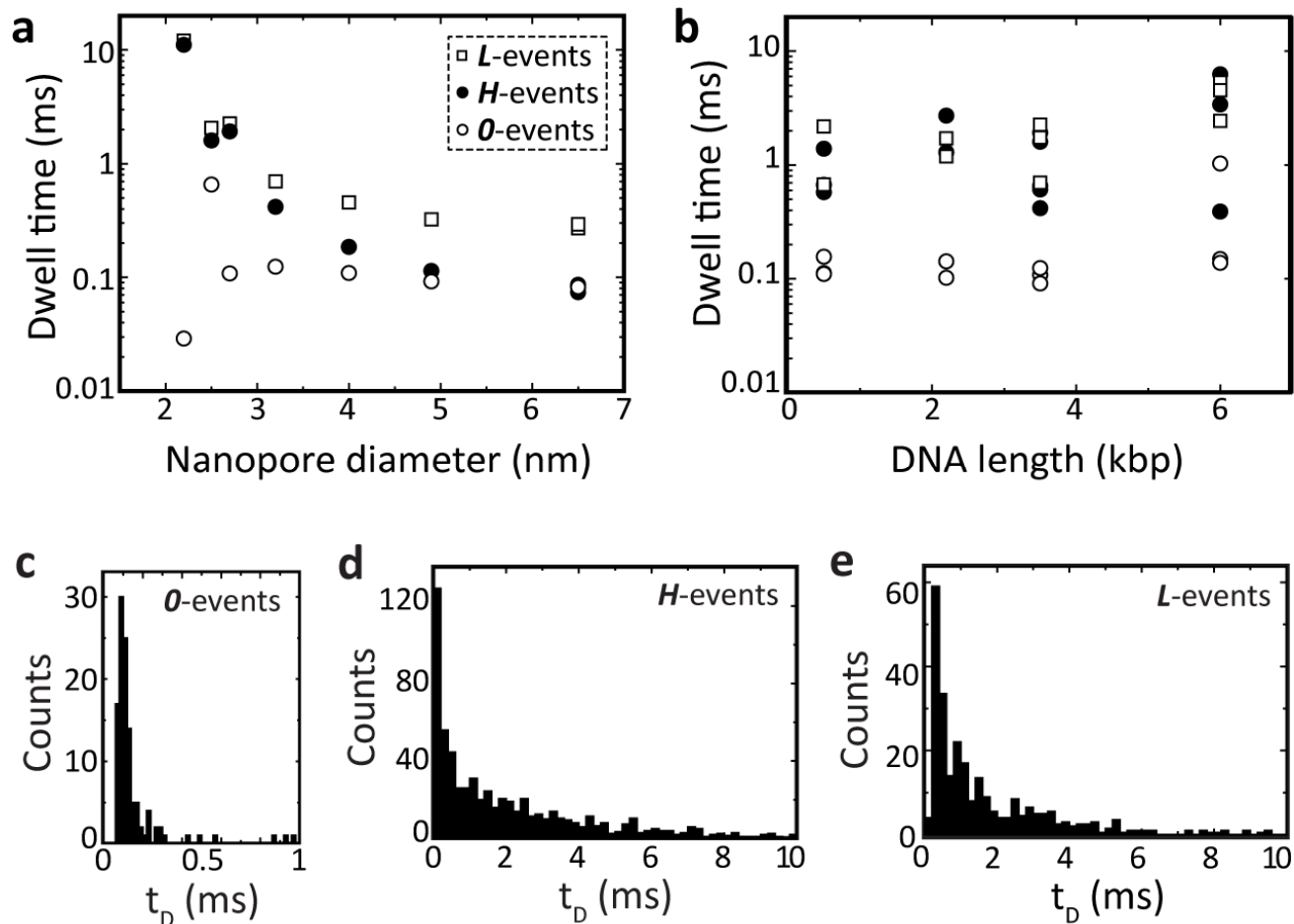


Figure S3. Analysis of the dwell time (t_D) distributions for the different event types (**O**-events: open circles; **H**-events: closed circles; **L**-events: open squares). **a.** Average dwell time versus nanopore diameter for 3.5 kbp DNA. The average dwell time is observed to decrease with increased nanopore size for both the **H**- and **L**-events. Typically, however, the **L**-events are associated with the longest dwell times. **b.** Average dwell time versus DNA length in nanopores of 2.5–3 nm in diameter. The average dwell time of both **H**- and **L**-events increases slightly with increased DNA length. **c – e.** Dwell time distribution of **O**-, **H**- and **L**-events in a 2.7 nm pore. Note the different timescale for the **O**-events. Multilevel events are included in the **H**- and **L**-events as described in the Materials and Methods. Average dwell times were calculated by taking the average of the individual event dwell times (for the separate populations).

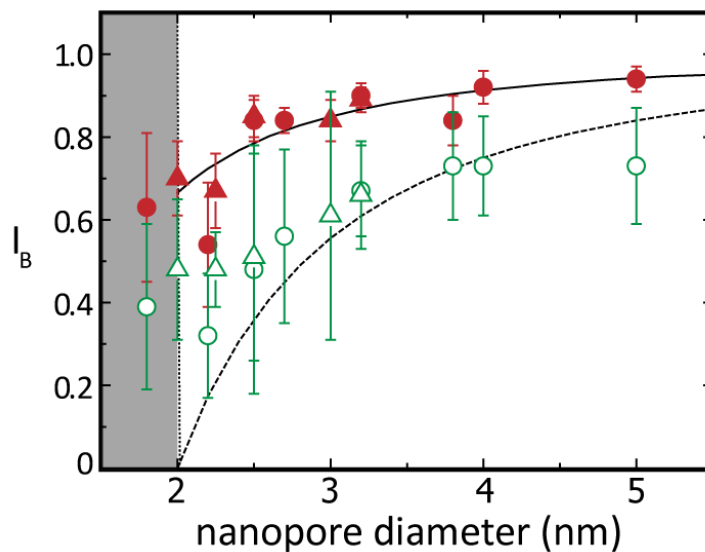


Figure S4. Average I_B versus nanopore diameter for 500 bp DNA (triangles) and 3.5 kbp DNA (circles). Closed (red) symbols represent average I_B values for the *H*-events, open (green) symbols correspond to average I_B values for the *L*-events. The I_B values are calculated by averaging the I_B values of the individual events (for both populations) and the errors reflect the standard deviation thereof. The dotted line corresponds to the value of I_B predicted under the assumptions that both the DNA and nanopore are perfect, impermeable, uncharged cylinders ($d_{\text{DNA}} = 2.0$ nm), and that the current blockade is fully determined by volume exclusion. The solid line corresponds to the I_B predicted under the assumptions that the pore is hourglass-shaped with a surface charge of -0.015 C/m², and the DNA is a permeable, charged cylinder with a linear charge density of -0.96 nC/m attracting counterions, of which 71% are assumed to be immobile [1]. The conductance blockade is described by formula (2) from Smeets et al [1]. The grey region denotes the region where the nanopore diameter is smaller than 2 nm, the diameter of the DNA double helix.

Supplementary References

[1] Smeets. et al. 2006. Salt dependence of ion transport and DNA translocation through solid-state nanopores. *Nano Letters*. 6:89-96.