# Supporting information

## Compression and Stretching of Single DNA Molecules under Channel Confinement

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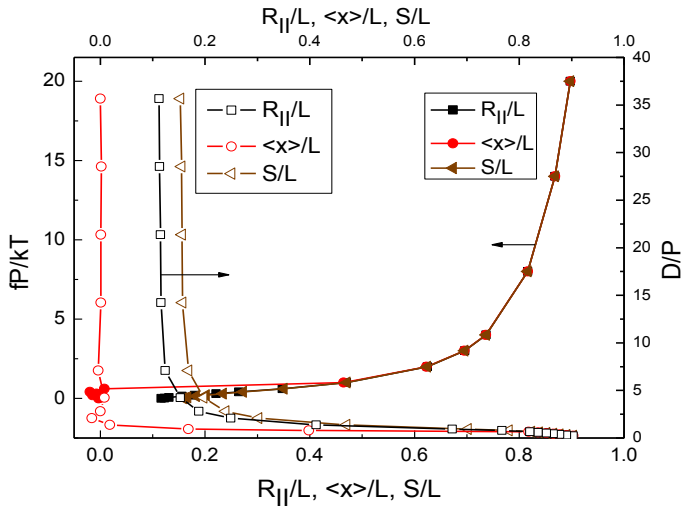


**Figure S1**. Plots of the reduced tensile force $fP/kT$ (full symbols) and of the reduced channel width $D/P$ (empty symbols) against the displacement variables $R_{II}/L$, $\langle x\rangle/L$, and $S/L$ for a single DNA molecule.

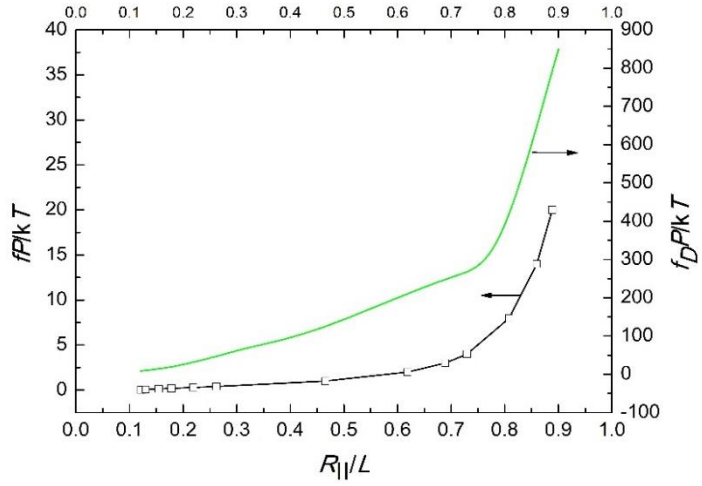


**Figure S2.** Comparison of the reduced external force $fP/kT$ with the confinement force $f_DP/kT$ computed from the data in ref.[3]

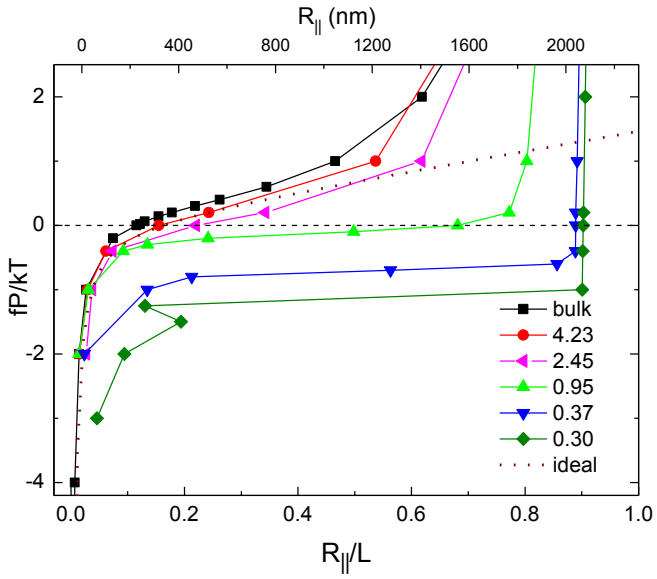


**Figure S3.** Enlargement of Figure 4 in the main text in the range of weak forces $fP/kT$ plotted as a function of $R_{II}/L$ for the channel-confined DNA.

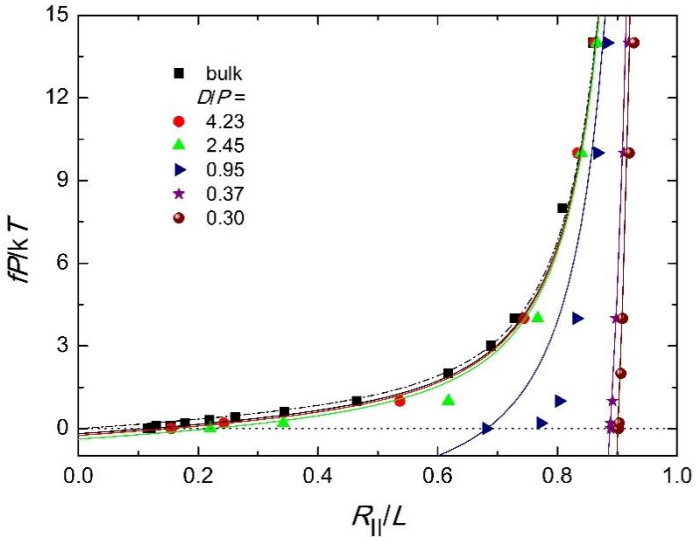


**Figure S4.** The fit of the tensile functions $f(R)$ in Figure 4 in the main text by eq 2 using the respective stress-free displacements $R_{IIo}$ at a given channel size.

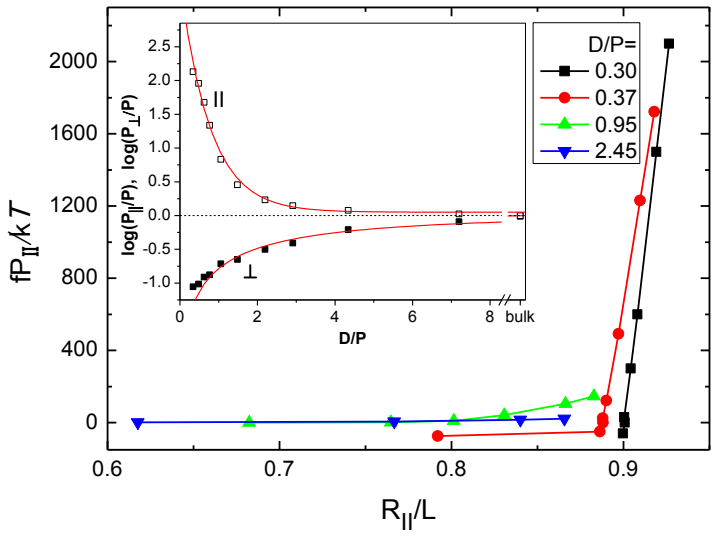


**Figure S5.** The plot of the tensile functions $f(R)$ in Figure 4 in the main text following an approach of ref[17] where the persistence length $P$ is replaced by the segmental correlation length $P_{II}$ in eq 2. The variation of the axial and transverse terms $P_{II}$ and $P_{\perp}$ with the channel size[31] is shown in the inset.

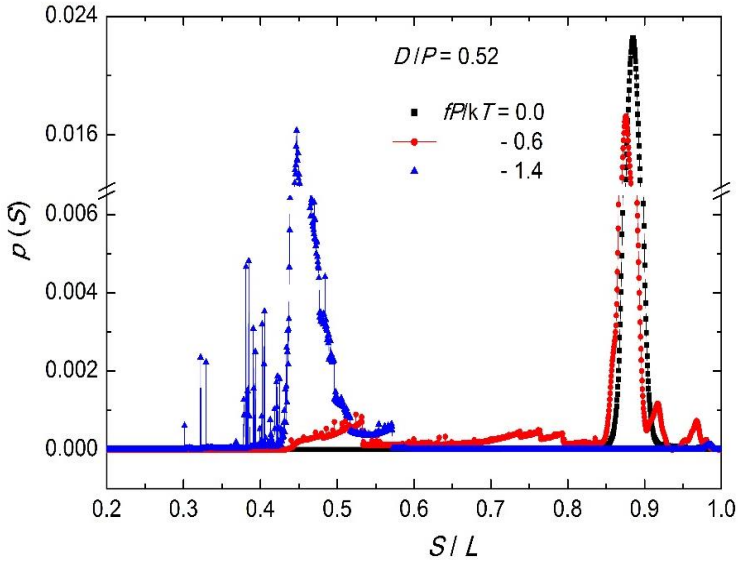


**Figure S6.** The radial distribution function $P(S)$ of a DNA molecule confined in a narrow channel of $D/P$ = 0.52 under action of the compressive force of $fP/kT$ = 0, -0.6, and -1.4.

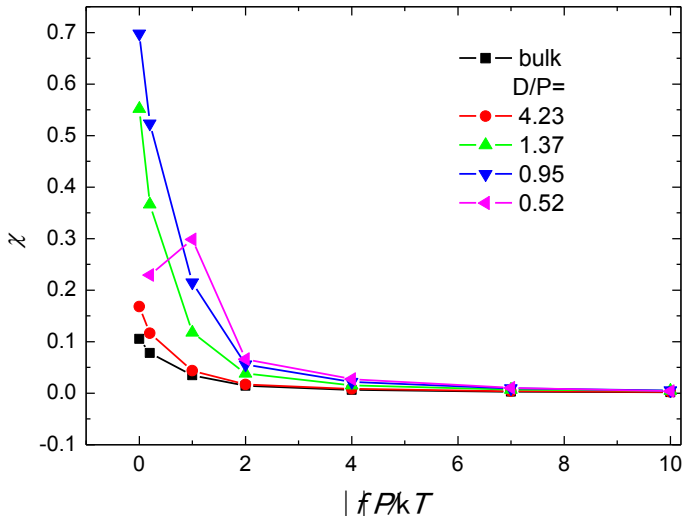


**Figure S7.** Compressibility $\chi = -(1/S)(dS/d|f|)$ of a DNA molecule at piston deformation in a cylinder defined in an analogy with the conventional isothermal compressibility.

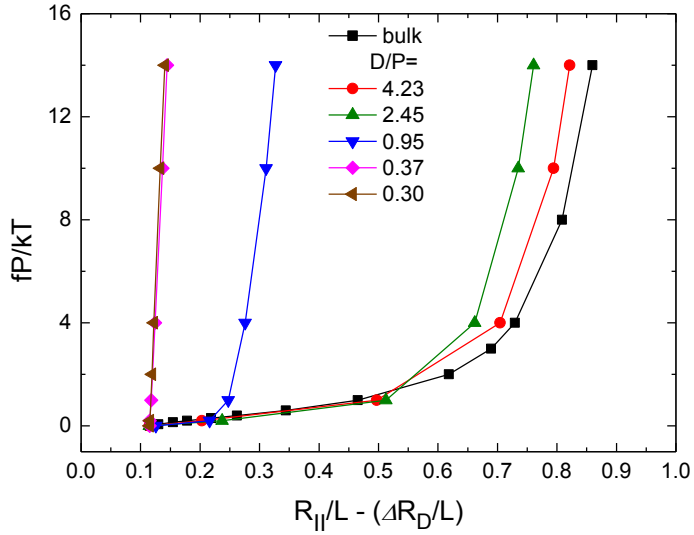


**Figure S8.** The representation of the elastic curves *f*-*R* in tensile region of confined DNA in Figure 4 in the main text after the elimination of the pre-stretching term $\Delta R_D = R_{II} - R_{IIo}$ in a given channel.