

Abstract Submitted
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Precise measurement of spring constant and friction coefficient of nano-confined T4 DNA CHRISTOPHER LÜSCHER, JONAS PEDERSEN, RODOLPHE MARIE, ANDERS KRISTENSEN, HENRIK FLYVBJERG, Naotech DTU — A simple method for accurate detection of dynamic parameters for DNA confined in nano fluidic channels is presented. T4 DNA is stained with YOYO-1 fluorescent dye and studied by epifluorescence under confinement in nanofluidic capillaries with cross-section less than 250 nm. A DNA molecule confined in a nanochannel of width below the molecule's radius of gyration is stretched to fill a length, L_0 of the channel. In equilibrium, the DNA will be subject to thermal fluctuations, which are governed by the drag force of the surrounding fluid and by the entropic spring constant of the DNA conformation in the channel. The power spectrum of the end-to-end length is described by a superposition of vibrational modes. The observed power spectrum reveals a shoulder at the lower frequencies, from which both the entropic spring constant and the friction coefficient of the nano-confined DNA can be determined. With this method, the spring constant and friction coefficient of nano-confined, YOYO-1 stained T4 DNA has been measured with a relative error below 15%.

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