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BOOK OF ABSTRACTS

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Brownian motion of nanofibers

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First experiments on Brownian motion of single-DNA were described about twenty years ago. Since then, it is difficult to find literature, reports, regarding other nano-objects characterized similar flexibility as DNA, biomolecule [1]. Majority research on the dynamic properties of the elastic fibers is based on numerical models of fibers shown as a connection of solid spherical beads or DNA observation [2]. Deformability and elasticity of long DNA chains resembles properties of long polymer nanofibres. Recently, the bead-spring model developed at IPPT was used to simulate the dynamic behavior of fibers in Poiseuille flow surprising replicated some coiling-uncoiling sequences only due to hydrodynamic interactions. Presently, we describe our attempts to construct highly flexible nanorodsand to evaluate their dynamics. Short hydrogel nanorods (1-100 μm) with diameter about 500 nm were extracted from core-shell structure by thedissolution of poly(L-lactide-co-caprolactone) shell. Obtained fluorescent nanorods were used for theobservationof Brownian motion and dynamics in Poiseuille flow. Understanding of the behavior of flexible nanofibers allows forthe verification of previously existing models and can helpe lucidate physical phenomena responsible for folding and bending dynamics of long molecular objects.

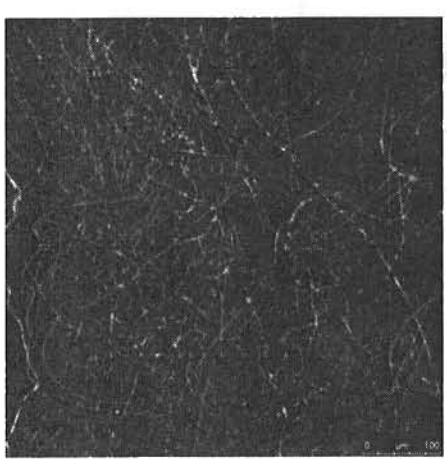

Fig. 1: Fluorescence image of coreshell-nanofibers with polyacrylamide core and PLC shell

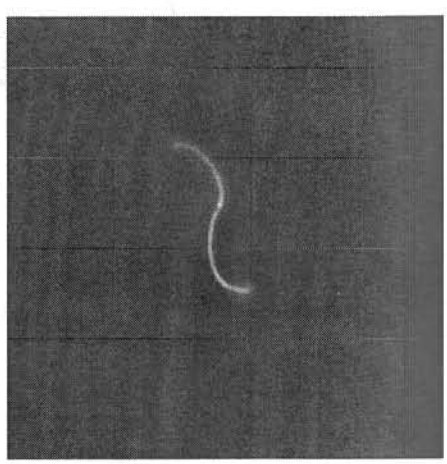

Fig. 2: Core polyacrylamide nanofiber observed during Brownian motion experiment

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