Splitting, linking, knotting, and solitonic escape of topological defects in nematic drops with handles

[illegible]

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G (25) 3D

(26) **n**(**r**)

$g = 1$. = 1

$r \sim \xi$. r = 1

,

–

$\sim 10\xi$ (1).

, –

- ( ) -

= 1 , -

r

. F $\xi \lesssim r \lesssim 100\xi$, -

= 1/2

(F 1B). B

, (18, 19)

- - ,

(F 1B). -

- -

, -

. A

, F 1C = 1/2

F 1 6((1) / 111 86(7 83 3( )-446( ) 651 9 / 8 18 340(0.517.2(31 4/ 1( )-( )5)-4

[illegible] (*i*) [illegible] *m* [illegible] *g* [illegible]; (*ii*) [illegible]

AB

[illegible] ([illegible]) [illegible] ([illegible] 1). [illegible] photolithography (24, 31). Desired polymer structures were obtained using replica molding and soft lithography (32). Norlin optical adhesive (NOA63) was placed between a glass plate and a substrate containing handlebody-shaped silica microstructures and then UV cured for 20 s using an OmniCure S2000 illumination system (Lumen Dynamics). The polymerized film was peeled off to leave the desired surface topography on one of its sides. We also fabricated flat polymer films of 5–10 μm in thickness needed to form closed handlebody-like surfaces by sandwiching the two films together. To realize homeotropic boundary conditions, we treated the polymer films and glass substrates by a 0.5 wt % aqueous solution of N,*N*-Dimethyl-*N*-octadecyl-3-aminopropyltrimethoxysilyl chloride or by a solution of lecithin in toluene (10). Additionally, some NOA63 films were heated to temperatures right beneath the isotropic nematic transition of the nematic LC E31 (from