

Abstract Submitted  
for the MAR14 Meeting of  
The American Physical Society

**Light guiding and lasing in Smectic-A liquid crystal fibers**

VENKATA SUBBA RAO JAMPANI, KARTHIK REDDY PEDDIREDDY, Max Planck Institute for Dynamics and Self-organization, SHASHI THUTUPALLI, Princeton University, CHRISTIAN BAHR, Max Planck Institute for Dynamics and Self-organization, IGOR MUSEVIC, Jozef Stefan Institute, STEPHAN HERMINGHAUS, Max Planck Institute for Dynamics and Self-organization — We demonstrate for the first time the optical applications of self-assembled smectic-A liquid crystal fibers in an aqueous micellar medium. These fibers consist of smectic-A layers arranged in a cylindrical fashion so that inevitably a topological line defect exists along the core of the fiber. Light guiding through the fibers and Whispering Gallery Mode (WGM) lasing in a plane perpendicular to the fiber are shown. The light guiding as well as the lasing threshold significantly dependent on the polarization of the excitation beam. The observed threshold for WGM lasing is very low ( $\sim 75 \mu\text{J}/\text{cm}^2$ ) when the pump beam polarization is perpendicular to the direction of the laser dye alignment. Further, these fibers are smooth and flexible and can be manipulated with laser tweezers demonstrating a promising approach for realization of soft photonic circuits.

Venkata Subba Rao Jampani  
Max Planck Institute for Dynamics and Self-organization

Date submitted: 12 Nov 2013

Electronic form version 1.4