

Abstract Submitted  
for the MAR09 Meeting of  
The American Physical Society

**Optical waveguiding in bent core liquid crystal filaments**<sup>1</sup> AN-TAL JAKLI, JAKE FONTANA, CHRIS BAILEY, Kent State University, Kent, OH, USA, WOLFGANG WEISSFLOG, Martin Luther University, Halle, Germany, ISTVAN JANOSSY, Research Inst. for Solid State Physics and Optics, Budapest, Hungary, PETER PALFFY-MUHORAY, Kent State University, Kent, OH USA — We demonstrate optical waveguiding in recently discovered free-standing bent core liquid crystal filaments. The bent core liquid crystal molecules self-assemble into a novel cylindrical geometry that is “solid-like” in the radial direction of the filament and liquid in the axial direction of the filament. Waveguiding properties of filaments of millimeter lengths were characterized. The transmitted power density through the filament was independent of temperature from 180oC to near room temperature. Initial defect of newly pulled filaments were found to self anneal, thus leaving perfectly defect free fibers, where light scattering was found to be insignificant. The absorbance was found to be strongly wavelength dependent in the visible regime and very small in the infrared range. A self-assembled optical waveguide with self-annealing fluid properties may have promising applications in optical communications.

<sup>1</sup>This work was supported by NSF IRES OISE-0727185.

Antal Jakli  
Kent State University, Kent, OH, USA

Date submitted: 17 Nov 2008

Electronic form version 1.4