

Abstract Submitted
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Bulk Structure and Interface Ordered Focal Conic Domains of the Dark Conglomerate Phase of a 4,4'-diphenylmethane Based Bent-Core Mesogen¹ J. MACLENNAN, D. CHEN, Y. SHEN, C. ZHU, L. HOUGH, M. GLASER, N. CLARK, Department of Physics, University of Colorado at Boulder, USA , N. GIMENO, M. ROS, Instituto de Ciencia de Materiales de Aragón, Universidad de Zaragoza-CSIC, Spain — The saddle-splay topology of the dark conglomerate (DC) phase has been established recently [L. E. Hough, *et al. Science* **325**, 452 (2009)]. On cooling, usually amorphous or disordered focal conic domains are obtained in the bulk. However, in the dark conglomerate phase of a 4,4'-diphenylmethane based bent-core mesogen at the liquid crystal/air interface, the air imposes strong homeotropic alignment at the free surface of the liquid crystal, forcing the smectic layers to form parallel to the surface. The bulk preference for saddle-splay curvature in the DC phase is then manifested at the surface as toric focal conic domains (TFCDs). The internal fluidity of the phase allows the TFCDs to anneal into a quasi ordered array, essentially forming a hexagonal structure with a periodicity of about 400 nm, correspond to the minimum elastic free energy. This directly confirms the proposed plumber's nightmare structure for the DC phase and indicates that ordered TFCDs may be produced in this phase under suitable conditions.

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