

Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Multistable alignment of nematic liquid crystals on patterned surfaces TIMOTHY ATHERTON, Tufts University — A nematic in contact with a substrate patterned to promote a spatially-varying easy axis experiences a large elastic distortion adjacent to the surface and relaxes to a uniform state in the bulk. The bulk ordering may be thought of as an effective easy axis which, unlike conventional surface treatments, can be easily controlled by adjusting the geometry of the pattern. In this work, the behavior of a nematic film confined between substrates periodically patterned with rectangles is examined analytically. It is shown that multiple stable configurations exist and the effective azimuthal anchoring energy may be arbitrarily controlled by changing the aspect ratio of the rectangles. The various effects of flexoelectricity and saddle-splay elasticity, both important because of large spatial gradients in molecular orientation near the surface, are also considered. Prospects for applications of these surfaces in electrooptic devices such as displays are discussed.

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Date submitted: 11 Nov 2011

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