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Topography induced homeotropic alignment of nematic liquid crystals[1] YOUNGWOO YI, NOEL CLARK, JOSEPH MACLENNAN, Department of Physics, The University of Colorado, Boulder, CO 80309, VAIBHAV KHIRE, CHRISTOPHER BOWMAN, Department of Chemical and Biological Engineering, The University of Colorado, Boulder, CO 80309 — We probe the orientation of a nematic liquid crystal on a planar aligning polymer film, where the film is topographically modified with sub micron scale checkerboard patterns. Alignment is studied in hybrid LC cells with the patterned polymer film on one plate and a self-assembled monolayer (homeotropic) on the other plate. A transition to homeotropic alignment on the pattern is observed as the pattern scale is reduced. An analysis shows that as the size of a square well becomes smaller the elastic energy of LCs decreases more slowly than the surface anchoring energy of the well, so that when the size of the well becomes small enough the elastic energy in planar configuration becomes comparable or larger than the polar anchoring energy of the surface.

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