1012-35-26   **A Majumdar**, **CJ Newton**, **JM Robbins** and **M Zyskin*** (M.Zyskin@bristol.ac.uk),
Department of Mathematics, University of Bristol, Bristol, England. *Stable configurations of nematic liquid crystals in rectangular cells with tangent boundary conditions.*

In the so-called one-constant approximation, stable configurations of nematic liquid crystals in a simply-connected polyhedral cell $P \subset R^3$ are described by continuous unit-vector fields (ie, maps to S^2), which are local minima of the Dirichlet energy. In the case of tangent boundary conditions, the unit-vector field is required to be tangent to the faces of P. In general we expect to have many topologically inequivalent minimisers. Analytic and numerical evidence indicates that in a rectangular prism, there are minimising configurations of simplest topology which are regular away from the vertices, while for nontrivial topologies it is often energetically preferable for topologically nontrivial behaviour to occur in thin tubes along the edges. For some topological types, there is a transition from regular to singular-on-edge behaviour, depending on the aspect ratios of the prism. We also discuss stable configurations in a geometry of rectangular posts in a rectangular cell, modeling a promising candidate design for new revolutionary bi-stable liquid crystal displays. (Received July 26, 2005)

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