

Order and force for liquid crystal defects

Epifanio G. Virga

Dipartimento di Matematica

Istituto Nazionale di Fisica della Materia

via Ferrata 1, 27110 Pavia, Italy

e-mail virga@dragon.ian.pv.cnr.it

Defect dynamics is a fascinating and challenging subject, not only for soft matter studies. In particular, the evolution equations of liquid crystals are only valid away from defects, whatever may be the way employed to describe the molecular ordering at a macroscopic scale. Singularities in either the order parameter field or in its gradient systematically arise close to defects, thus jeopardizing the numerical methods used to discretize the dynamical equations. It would be desirable to derive from first principles the law governing the motion of defects, thought of as individual particles within the surrounding viscous fluid. A first step to this aim is to determine the force that would set a defect in motion. In this lecture, I will show how this force can be affected by the change of order in the vicinity of the defect, which can sometimes be dramatic, also as a result of external causes.