Annihilation of Point Defect Pairs

AMINE MISSAOU1,2, EMMANUELLE LACAZE1 AND RALF STANNARIUS2
1 INSP PARIS, France. 2 OvGU Magdeburg, Germany

Motivation

Topological defects are found in a broad variety of dynamic physical systems such as anisotropic fluids, quantum systems or even in cosmology. Defect dynamics are of crucial importance, particularly at phase transitions.

Liquid crystals allow straightforward optical observations, with sample dimensions and time scales in conveniently accessible ranges. Studies in nematics are not easy to interpret because of the three-dimensionality of the problem. Freely suspended smectic-C films are an ideal model to study defect dynamics: they behave as quasi-twodimensional polar nematics.

Materials and Experimental techniques


Summary

We have developed a technique to create isolated defect pairs with opposite topological charges in SmC films.

The dynamics is strongly influenced by the orientation of the −1 defect with respect to the connecting axis and the outer field mismatch.

The generation of flow by defect interactions reduces annihilation times and introduces an asymmetry between the motions of the +1 defect and the -1 defect.