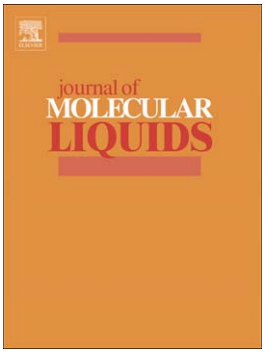

Quenched disorder of a nematic liquid crystal under a magnetic field

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Abstract

We report measurements and theoretical predictions on the effect of an aligning magnetic field on the orientational disorder of a nematic liquid crystal in contact with isotropic solid substrates. Different types of substrates present a similar disorder and a similar dependency on the magnetic field amplitude, i.e. a decreasing of the angular distribution widths and spatial correlation lengths. Measurements are in qualitative agreement with a theory where the orientational disorder emerges from the competition between the aligning magnetic torque and the disorienting thermal fluctuations during the adsorption of the liquid crystal molecules on the substrate.

Keywords: nematic liquid crystal, surface, quenched disorder

1. Introduction

Quenched disorder refers to a disorder which does not depend on time. It is ubiquitous in solid condensed matter as it is related to unavoidable defects

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