Theory and Simulation of the Ferroelectric Nematic Phase: First Year Report

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1 Introduction

The **ferroelectric nematic** (N_F) phase represents a groundbreaking discovery in the field of liquid crystals, combining both the orientational order of nematic liquid crystals with the polar order characteristic of ferroelectric materials. In traditional nematic phases, molecules align along a common direction, but without a net dipole moment. In contrast, the ferroelectric nematic phase exhibits a spontaneous polarization, meaning that the molecules not only align but also possess a net dipole moment that can be switched by an external electric field.