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Glassy structure and thermal fluctuations of amorphous nematogenic solids FANGFU YE, BING LU, University of Illinois, XIANGJUN XING, Shanghai Jiao Tong University, PAUL GOLDBART, University of Illinois — Amorphous nematogenic solids (ANS) are media comprising rod-like nematogens that have been randomly linked to form macroscopic, elastically deformable networks. Classes of ANS include chemical nematogen gels (i.e., networks of small molecules) and liquid crystalline elastomers (built from crosslinked nematogen-containing macromolecules), as well as biophysical networks, such as those composed of actin filaments. One common feature of these systems is that the linking process introduces into them a new type of random field, consisting of a conventional static part along with a new, thermal-fluctuation-induced, dynamic part. We develop a phenomenological model of ANS which shows how this composite random field, together with the coupling between the orientational and positional fluctuation that nematogens exhibit, leads to the occurrence of decaying but also oscillatory correlations of the thermal fluctuation, and also shows how these correlations influence the glassy structure of ANS.

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