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Propositions
accompanying the thesis
Gauge Theory and Nematic Order
The rich landscape of orientational phase transition

I
Gauge theories are not an alternative but in fact a rather necessary route to study
the statistical physics of liquid crystals.
Chapter 3 and chapter 4 of this thesis

II
The most symmetric nematic orders are subjected to extremely large fluctuations,
and thus are difficult to stabilize.
Chapter 3 of this thesis

III
A symmetry can spontaneously break down to any of its subgroups. The associated
phase transitions are in general of different nature.
Chapter 5 of this thesis

IV
Although phase transitions are in principle allowed for any two symmetries related
via a subgroup relation, suitable tuning parameters are needed to realize such
transitions.
Chapter 5 of this thesis

V
Many physicists believe that superconducting phases break the local gauge
symmetry. However, as described by Elitzur's theorem, gauge symmetries cannot
break spontaneously. Superconducting phases in fact break the gauged global U(1)
symmetry.

VI
Gauge symmetry is not a symmetry but a redundancy in the description of a physical
system (see, e.g., Wen's Quantum Field Theory of Many-Body Systems for
reference), and can be introduced as an auxiliary tool to facilitate the calculations
and/or to incorporate the effects of interactions.
X.-G. Wen, Quantum Field Theory of Many-Body Systems,
VII
The classification of topological defects in liquid crystals has been subjected to extensive discussions since 1970s (see the reference). The dynamical properties of these defects, such as their creation, annihilation, motion and interplay with each other, however, have been largely ignored.

VIII
The results of Beekman et al. indicate that condensates of topological defects can be a real form of matter.

IX
Nematic phases have a great potential in the quest to explore the physics of non-Abelian topological order.

X
A lack of substance demands wrapping.

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