

Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

**Melting transitions of quantum liquid crystalline order coexisting
with electronic topological Chern insulators or other topological phases¹**

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University of Illinois, Urbana Champaign — Motivated by recent progress in understanding the interplay between the lattice and electronic topological phases, we consider quantum-melting transitions of liquid crystalline order that coexists with electronic topological phases. In certain classes of Chern band insulators, it has been previously demonstrated that there are topological Chern-Simons terms for local lattice deformations such as a Hall viscosity term. The Chern-Simons terms can induce non-trivial statistics for the topological lattice defects and furthermore dress the defects with certain symmetry quantum numbers. On the other hand, the melting transitions of such liquid-crystalline orders are driven by the condensation of lattice defects. Based on these observations, we show how the topological terms can change the nature of the proximate phases of the quantum liquid crystalline phases. We derive and study the effective field theories for the quantum phase transitions, and demonstrate some concrete examples.

¹The authors are supported by the ICMT postdoctoral fellowship at UIUC (GYC) and by the US Department of Energy under contracts DE-FG02-07ER46453 (TLH) and DE-SC0009932 (RGL).

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Date submitted: 15 Nov 2013

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