Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Unravelling incommensurate magnetism and the path to topological phases in iron-based superconductors MORTEN HOLM CHRISTENSEN, BRIAN ANDERSEN, PANAGIOTIS KOTETES, Niels Bohr Inst — Motivated by recent experiments on iron-based superconductors hinting at incommensurate magnetic order, we investigate generic itinerant systems exhibiting a tendency towards incommensurate magnetism with ordering wavevectors $\mathbf{Q_{1,2}} = (\mathbf{Q}, \mathbf{0})/(\mathbf{0}, \mathbf{Q})$ and retrieve the complete phase diagram and leading instabilities near the paramagnetic-magnetic transition via a Landau approach. The aspect of incommensurability introduces a plethora of new exotic phases that can either preserve or violate C_4-symmetry. We additionally aim at unveiling prominent candidates for the recently observed, and yet unresolved, C_2 magnetic phase in Ba-doped iron-based superconductors (FeSCs). Within a representative five-orbital model we show that these nonstandard incommensurate magnetic phases become indeed favored in FeSCs. In fact, a C_4-preserving non-coplanar texture becomes stabilized and can be rendered skyrmionic by applying an infinitesimaly small external magnetic field. We illustrate how the microscopic coexistence of the latter with superconductivity, a feasible scenario for FeSCs, opens new perspectives for realizing intrinsic topological superconductivity.

Morten Holm Christensen
Niels Bohr Inst

Date submitted: 11 Nov 2016 Electronic form version 1.4