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**Competing orders in the Dirac-like electronic structure and the non-linear sigma model with the topological terms** POUYAN GHAEMI, LBNL and Department of Physics UC Berkeley, SHINSEI RYU, Department of Physics UC Berkeley — The Dirac-like electronic structure can host a large number of competing orders in the form of mass terms. In particular, two different order parameters, can be said to be dual to each other, when a static defect in one of them traps a quantum number (or “charge”) of the other. The complementary nature of the pair of the order parameters shows up in their dynamical properties (correlation functions) in the following sense: When a quantum phase transition is driven by one type of fluctuations in order parameter, approaching the transition from the disordered (paramagnetic) side, the order parameter correlation function at the critical point is reduced. On the other hand, such fluctuations enhances the correlation of the dual order parameter. Such complementary behaviors in the correlation function can be used to diagnose the nature of quantum fluctuations that is the driving force of the quantum phase transition.

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