

Abstract Submitted
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Time-reversal asymmetry without local moments via directional scalar spin chirality PAVAN HOSUR, Stanford Univ — Quantum phases of matter that violate time-reversal symmetry invariably develop local spin or orbital moments in the ground state. Here, a directional scalar spin chiral order (DSSCO) phase is introduced, that disrespects time-reversal symmetry but has no static moments. It can be obtained by melting the spin moments in a magnetically ordered phase but retaining residual broken time-reversal symmetry. Orbital moments are then precluded by the spatial symmetries of the spin rotation symmetric state. Interestingly, polar Kerr effect in the 3D DSSCO has the same symmetries as those observed experimentally in the pseudogap phase of several underdoped cuprates. Finally, it is shown that the DSSCO provides a phenomenological route for reconciling the results of Kerr effect and nuclear magnetic resonance experiments in the cuprates, with charge ordering tendencies – observed in X-ray diffraction studies – playing a crucial role. The so-called "memory effect" in the cuprates can be incorporated into this picture as well.

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