

Abstract Submitted
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Fractionalization in a strongly correlated exciton system¹ SUNG-SIK LEE, PATRICK LEE, Massachusetts Institute of Technology — We show that fractionalized phases arise out of a strongly coupled exciton bose condensate in a multi-band insulator. Based on a world line picture of exciton, we demonstrate that the deconfinement phases can occur in a gauge theory of the exciton model despite an infinite bare gauge coupling. A world sheet of electric flux line in the emergent gauge theory is identified as a web of exciton world lines. It is shown that a deconfined U(1) gauge theory with “photon” and either fractionalized boson or fermion can emerge out of a single model depending on the coupling constants. The statistics and spin of the fractionalized particles are shown to be determined uniquely by the dynamics of the model. The exciton model can be numerically simulated without sign problem and some of our results will be shown.

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