



# Joint Seminar



Thursday, August 18  
11am-12:30pm  
2205 Physics Building

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## “Boson pairing and unusual criticality in a generalized XY model”

Over the years there has been considerable interest in bosonic systems where both single particle condensates and pair condensates may form. On general grounds the transition between these two condensates may be of the Ising type. Ordering of the phase occurs modulo  $2\pi$  in the single particle condensate and modulo  $\pi$  in the pair condensate. Thus moving from the latter to the former involves an additional breaking of an Ising symmetry.

A simple statistical model that captures this physics is the generalized XY model of the title, where terms with both  $2\pi$  periodicity and  $\pi$  periodicity terms are included. 25 years ago this model was introduced by Korshunov and by Grinstein and Lee and its topological defects and phase diagram in two dimensions discussed. In this work we show, on the basis of both a field theoretical formulation of the problem and numerical simulations, that there is a narrow region of the phase diagram where a direct continuous Ising transition exists from the high temperature (disordered) phase to the (quasi-) long range ordered phase. This constitutes a toy version of the ‘deconfined criticality’ scenario.

**All are welcome to attend.**