

Abstract Submitted
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Condensation of topological excitations in two coupled layers of Josephson junction arrays. SAID SAKHI, American University of Sharjah, PO Box 26666, Sharjah,UAE — The phase diagram of two coupled layers of Josephson junction arrays (JJA) in the presence of charge and magnetic frustration is investigated. The quantum phase model of JJA is mapped in the self-dual limit into an Abelian gauge theory with Maxwell terms and a mixed Chern–Simons term. The low effective field theory is shown to be governed by complex fields associated with disordering caused by electric charges and magnetic charges minimally coupled to two gauge fields related to the currents of Cooper pairs and vortices. The condensation of disorder fields leads to a rich phase diagram with important features not attainable by standard mean field theories. In addition to insulating and superconducting phases, the bi-layer system displays interesting interplay between Hall quantization and interlayer coherence: Hall quantized states with and without interlayer coherence and interlayer coherent states without Hall quantization. S. Sakhi , *Quantum disordering effects in bilayer Josephson junction arrays* , J. Phys. A: Math. Theor. 41 (2008) 085003.

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