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Superfluidity of Bosons in Kagome Lattices with Frustration XIAO-QI SUN, ZHU CHEN, YI-ZHUANG YOU, HUI ZHAI, Institute for Advanced Study, Tsinghua University, Beijing, 100084, China — We consider spinless bosons in a Kagome lattice with nearest-neighbor hopping and on-site interaction, and the sign of hopping is inverted by insetting a π flux in each triangle of Kagome lattice so that the lowest single particle band is perfectly flat. We show that in the high density limit, despite of the infinite degeneracy of the single particle ground states, interaction will select out the Bloch state at the K point of Brillouin zone for boson condensation at the lowest temperature. As temperature increases, the single boson superfluid order can be easily destroyed, while an exotic triple-boson paired superfluid order will remain. We establish that this trion superfluid exists in a broad temperature regime until the temperature is increased to the same order of hopping and then the system turns into normal phases. Finally we show that time of flight measurement of momentum distribution and its noise correlation can be used to distinguish these three phases.

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