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Footprint of non-decoupling in chiral phase transition

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We study chiral phase transition of two flavor massless QCD in the presence of a finite breaking of U(1) axial symmetry using the corresponding linear sigma model (LSM), in which half of eight scalar fields acquire the mass proportional to the U(1) breaking. Naively, the model is expected to reduce to ordinary O(4) LSM in the infrared limit if the massive degrees of freedom decouple sufficiently fast. We examine this expectation through the analysis of the renormalization group flows of the model, and discuss possible non-decoupling effects in chiral phase transition.

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