

Abstract Submitted  
for the MAR13 Meeting of  
The American Physical Society

**Unified Description of Nambu-Goldstone Bosons without Lorentz Invariance** HARUKI WATANABE, University of California, Berkeley, HITOSHI MURAYAMA, Kavli IPMU; University of California, Berkeley; Lawrence Berkeley National Laboratory — We address the well-known problem that Nambu-Goldstone's theorem does not correctly predict the number of Nambu-Goldstone bosons in systems without Lorentz invariance. Using the effective Lagrangian approach, we provide a general prescription to predict the number of Nambu-Goldstone bosons and the form of their dispersion relation correctly. We trace the abnormalities in non-Lorentz invariant systems back to Nambu-Goldstone boson pairs becoming canonically conjugate—this reduces the number of Nambu-Goldstone bosons and changes the linear dispersions to quadratic. The generality of our construction clarifies the powerful approach of analyzing quantum many-body systems—including strongly coupled systems—by their symmetry breaking patterns. This will also aid our understanding of recent experiments and theoretical works on spinor BECs and lattices of topological defects. Reference: H. Watanabe, H. Murayama, PRL 108, 251602 (2012)

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Date submitted: 11 Dec 2012

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