

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Unified Approach to Quantum and Classical Dualities¹ EMILIO COBANERA, GERARDO ORTIZ, Indiana University, Bloomington, IN, ZOHAR NUSSINOV, Washington University, St. Louis, MO — We discuss a new systematic and algebraic approach to searching for dualities in quantum systems. By associating “bond algebras” to quantum Hamiltonians we show how dualities can be characterized, recognized as unitary transformations, and mapped to dualities of classical partition functions. Hence our approach unifies classical and quantum dualities and provides a powerful method for determining exact properties of systems of interest. We show how duality transformations can be used always to eliminate gauge symmetries completely, and present a new duality between the Abelian Higgs model and a generalized Kitaev’s extended toric code model in *three space dimensions* that illustrate this point. We also show new dualities for Z_p gauge models.

¹Phys. Rev. Lett. 104, 020402 (2010)

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Date submitted: 28 Dec 2010

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