Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Dyon condensation: an effective way to construct topological phases with symmetry PENG YE, XIAO-GANG WEN, Perimeter Institute — In this work, we construct three-dimensional exotic phases of bosons with time-reversal symmetry and boson number conservation U(1) symmetry by means of *fermionic projective construction*. We first construct an *algebraic bosonic insulator* which is a symmetric bosonic state with an emergent U(1) gapless gauge field. We then obtain many gapped bosonic states that do not break the time-reversal symmetry and boson number conservation via proper *dyon condensations*. We identify the constructed states by calculating the allowed electric and magnetic charges of their excitations, as well as the statistics and the symmetric transformation properties of those excitations. This allows us to show that our constructed states can be trivial SPT states (*i.e.* trivial Mott insulators of bosons with symmetry), non-trivial SPT states (*i.e.* bosonic topological insulators) and SET states (*i.e.* fractional bosonic topological insulators). In non-trivial SPT states, the elementary monopole (carrying zero electric charge but unit magnetic charge) and elementary dyon (carrying both unit electric charge and unit magnetic charge) are fermionic and bosonic, respectively. In SET states, intrinsic excitations may carry fractional charge.

Peng Ye
Perimeter Institute

Date submitted: 05 Nov 2013 Electronic form version 1.4