

## **Ground states of Bose-Einstein condensates with higher order interactions**

**Yongyong Cai**

**Applied and Computational Mathematics, Beijing Computational Science Research Center, China**

**Email: [yongyong.cai@csrc.ac.cn](mailto:yongyong.cai@csrc.ac.cn)**

We analyze the ground states and dynamics of a Bose-Einstein condensate in the presence of higher-order interactions (HOI), modeled by a modified Gross-Pitaevskii equation (MGPE). In fact, due to the appearance of HOI, the ground state structures become very rich and complicated. We establish the existence and non-existence results under different parameter regimes, and obtain their limiting behaviors and/or structures with different combinations of HOI and contact interactions. Both the whole space case and the bounded domain case are considered, where different structures of ground states are identified. In addition, HOI effects on dynamics are investigated.

References:

[1] X. Ruan, Y. Cai and W. Bao, *J. Phys. B: AMO*, 49 (2016).