

Abstract Submitted  
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**Towards quantum simulation with two-electron  $^{173}\text{Yb}$  fermions in an optical lattice**<sup>1</sup> BO SONG, YUEYANG ZOU, CHENGDONG HE, ELNUR HACIYEV, GEYUE CAI, WING KIN CHAN, WEI HUANG, GYU-BOONG JO<sup>2</sup>, Hong Kong Univ of Sci Tech — Recent development of cooling and manipulating Ytterbium atoms opens a new avenue to investigate unprecedented atomic systems with  $\text{SU}(N)$  spin symmetry and orbital degrees of freedom. The available metastable states and narrow-line optical transitions of Ytterbium atoms allow for the versatile control of the system. Here, we first describe our apparatus for producing ultracold Ytterbium-173 quantum gases in an optical lattice. A gas of  $3 \times 10^4$  Ytterbium-173 atoms is routinely produced at  $T/T_F \sim 0.3$ , and loaded into an optical lattice potential. Then we report our recent progress on the spin orbital (SO) coupling interaction realized in optical lattice. As a novel quantum simulator, cold Ytterbium atoms with SO coupling provide a platform to explore the intriguing topological physics.

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