MENDERES ISKIN, AHMET T. B. BOLUKBASI, Koc University — We consider a square optical lattice in two dimensions and study the effects of both the strength and symmetry of spin-orbit coupling (SOC) and Zeeman field on the ground-state, i.e., Mott insulator (MI) and superfluid (SF), phases and phase diagram, i.e., MI-SF phase transition boundary, of the two-component Bose-Hubbard model. In particular, based on a variational Gutzwiller ansatz, our numerical calculations show that the spin-orbit coupled SF phase is a nonuniform (twisted) one with its phase (but not the magnitude) of the order parameter modulating from site to site. Fully analytical insights into the numerical results are also given.

1A. T. B is supported by TÜBİTAK 2218 Domestic Postdoctoral Fellowship Program, and M. I. is supported by the Marie Curie IRG Grant No. FP7-PEOPLE-IRG-2010-268239, TÜBİTAK Career Grant No. 3501-110T839, and TÜBA-GEBİP.