Abstract Submitted
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Angle-resolved photoemission spectroscopy study of the magnetic doped topological insulator ultra-thin film $Bi_2Fe_xSe_3$[1] YI ZHANG, LBL/SIMES, BO ZHOU, Stanford/Oxford, YULIN CHEN, Oxford, SUNG-KWAN MO, ZAHID HUSSAIN, LBL, ZHI-XUN SHEN, SIMES/Stanford — Topological insulator is a new type of quantum matter with gapped bulk states coexisting with a gapless surface state (SS) that is protected by time reversal symmetry and robust against non-magnetic impurities. Researches have shown that there exist two routes to open a gap in the SS: doping with magnetic impurities and the coupling of SS on opposite surfaces in ultra-thin films. In order to study the mixing of these two types of gap-opening, we prepared ultra-thin $Bi_2Fe_xSe_3$ films, grown by molecular beam epitaxy, with different Fe concentration and thickness. Size of the gap and its development with Fe concentration and film thickness as well as its momentum dependence have been systematically characterized by in-situ angle resolved photoemission spectroscopy using synchrotron light source.

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