I. DFT ON $MNBI_2TE_4$

A. Methods

To estimate parameters of the low-energy model, we performed density-functional calculations (DFT) using as structural model a slab consisting of six $MnBi_2Te_4$ unit cells with a vacuum of 30 Bohr radiie (Fig. 1a) We use the experimental bulk lattice parameters and atomic positions. The calculations are based on the GGA+U method with the generalized grandient approximation [**?**] as implemented in the FPLO code version 48.00-52 [**?**]. We fix parameters $U = 5.34\,\text{eV}$ and $J = 0$, as in Ref. [**?**] and use the atomic limit flavor for the double counting correction. The spin-orbit interaction is considered in the fully-relativistic four-component formalism. Numerial k-space integrations are performed with a tetrahedron method with a mesh of $12 \times 12 \times 1$ subdivisions in the Brillouin zone. For the calculations of the density of states (DOS), we consider a mesh of $36 \times 36 \times 3$ subdivisions.

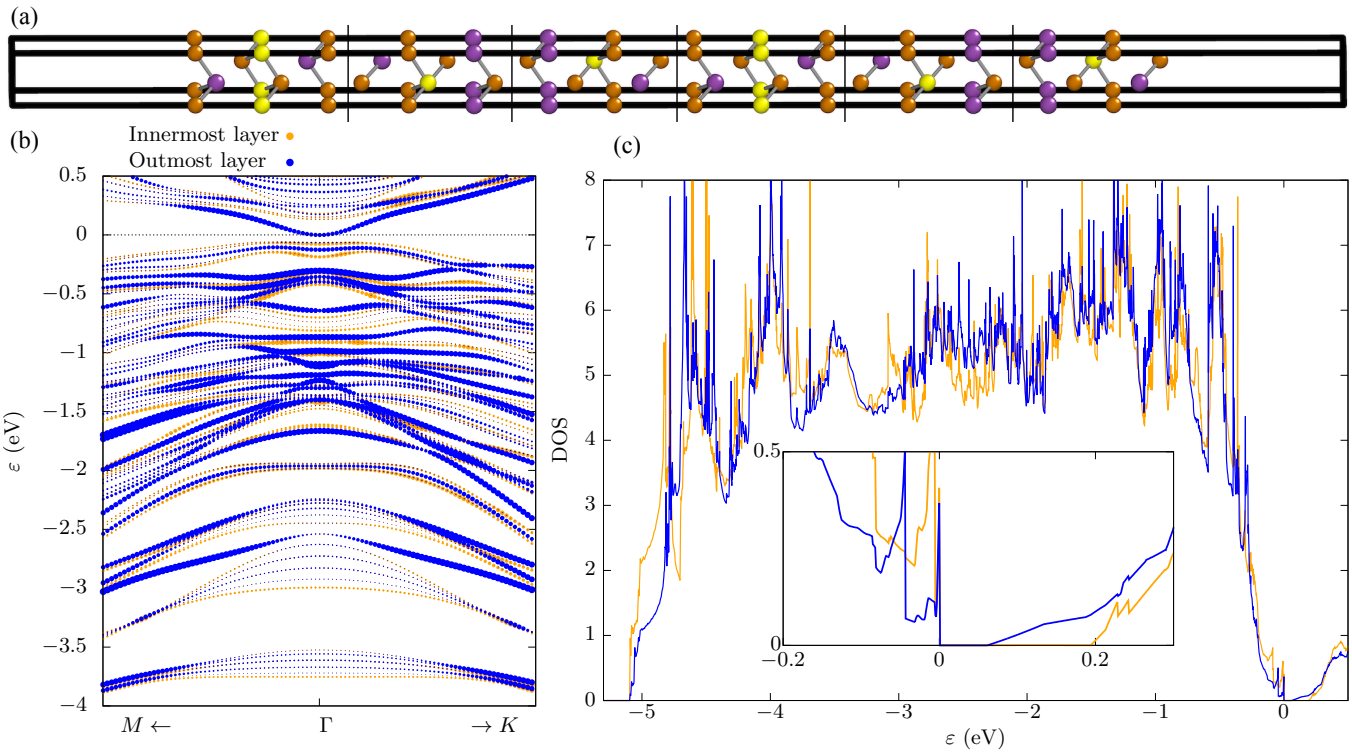

FIG. 1. a) Structural model used in the density-functional calculation. b,c) Projection of the bandstructure and DOS, respectively, on the innermost and outermost layers of the slab.

B. Estimation of parameters

1. *Chemical potential*

2. *Mn - Mn in-plane exchange and magnetic anisotropy*

For the magnetic anisotropy K, Ref. [**?**] finds 0.225 meV per Mn atom, while we found 0.38 meV per Mn atom. Check with Manuel.

3. Surface density

4. Surface gap

5. Fermi velocity
