# Electronic structure and magnetic properties of Dy-doped $Bi_2Te_3$

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Doping the topological insulator $Bi_2Te_3$ with rare-earth ions is a way to introduce the high magnetic moments into the material [1]. Ferromagnetic order can break time-reversal symmetry, opening a gap in the topological surface states.The correlated band theory implemented as a combination of the relativistic density functional theory with the Anderson impurity model [2] is applied to theoretical investigation of the electronic and magnetic character, and the magnetic anisotropy for Dy-doped $Bi_2Te_3$ topological insulator. For both ferro- and anti-ferromagnetic Dy-planes in $Bi_2Te_3$ we found the in-gap flat $f$-bands located at the top of the valence band of $Bi_2Te_3$. The positive uniaxial MAE is predicted for $(Dy_xBi_{1-x})_2Te_3$ with $x = 0.33$. The experimental resonant photoemission spectra are well reproduced by the calculations [3]. These studies can be important to explore the potential use of rare-earth doped topological insulators in the low-power spintronic devises.

**References:**

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