# CALCULATED MAGNETIC AND SPIN-DEPENDENT PROPERTIES OF FeCo/MgO/FeCo TUNNEL JUNCTION

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The electronic structure of epitaxial bcc $Fe_{1-x}Co_x$/MgO/$Fe_{1-x}Co_x$ (001) ($0 \leq x \leq 1$) magnetic tunnel junctions (MTJ) have been studied by means of a tight-binding linear muffin-tin (TB-LMTO) Green's function technique combined with the coherent potential approximation (CPA) in order to describe the chemical disorder like $Fe_{1-x}Co_x$ alloyed layers and/or the interdiffusion at the FeCo/MgO interfaces.

The magnetic behaviours of FeCo/MgO/FeCo MTJ's as well as the influence of the interdiffusion at the FeCo/MgO interfaces on these are analyzed.

The conductance and the tunnelling magnetoresistence ratio (TMR) in the current perpendicular-to-the plane configuration (CPP) are calculated within the transmission matrix formulation of the Kubo-Landauer formalism. High values of the TMR ratio are obtained i. e., TMR=300 % for Fe/MgO/Fe MTJ. Preliminary results on current-induced magnetization switching phenomena in FeCo/MgO/FeCo MTJ based on spin-mixing conductance evaluation [1, 2] are presented.

[1] K. Xia, P. J. Kelly, G. E. W. Bauer, A. Brataas and I. Turek, Phys. Rev. B **65**, 220401 (2002).
[2] K. Carava, I. Turek, J. Magn. Magn. Mater. **316**, e926 (2007).