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Ab initio calculations of bias voltage dependence of magneto crystalline anisotropy in magnetic tunnel junctions CHRISTIAN HEILIGER, CARSTEN MAHR, MICHAEL CZERNER, Institute for Theoretical Physics, Justus Liebig University Giessen, Germany — Spin-orbit effects play an important role in current spintronics research. One effect due to spin-orbit coupling is the magneto crystalline anisotropy (MCA) and the control of this effect by a bias voltage. Using density functional theory in combination with non-equilibrium Greens function method we calculate the bias voltage dependence of MCA for the case of a V/Fe/MgO/V. We discuss the dependence of MCA and of the tunneling anisotropic magneto resistance (TAMR) on the Fe and MgO slab thicknesses. Further, we show the voltage dependence of spin-torque originated in these tunnel junctions and clarify the connection to the MCA. All our results are compared to recent experimental results in the same junctions.

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