

# Magnetic and magnetotransport properties of the hybrid anisotropy structures

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Nowadays, multilayers with different types of magnetic anisotropy (hybrid anisotropy structures (HAS)) are being actively investigated. These materials are important for practical use as spin-torque oscillators (STO) and medium for energy-assisted magnetization switching. The layers with perpendicular anisotropy allows to increase the switching speed, thermal stability, zero-field operation of STO, and layers with in-plane anisotropy, that break the axial symmetry of layers with PMA, can act as both a polarizer and a read-out layer.

In this paper, we investigated the magnetic and magnetoresistive properties of the hybrid multilayer structure with in-plane and out-plane anisotropies ( $[\text{Co}/\text{Ni}]_{15}$  and  $[\text{Co}/\text{Pt}]_4$ , respectively) separated by a Cu interlayer. The effect of indirect exchange interaction on hysteresis, saturation fields, and magnetoresistance of HAS was investigated by experimentally techniques and micromagnetic simulation.