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Influence of disorder on domain wall dynamics in CoFeB-MgO structures with perpendicular anisotropy

APRIL, 3

Tuesday, 10:00

Seminar room 52.02
CEITEC BUT, Purkynova 123

Materials with perpendicular magnetic anisotropy (PMA) are considered as the most promising candidates for the next generation of ultra-high density Magnetic Random Access Memory (MRAM) devices. One crucial issue for MRAM technologies is to better understand and minimize the role played by structural inhomogeneities that induce a distribution of magnetic properties and stochastic behaviour. In this talk, we will present our recent results of magnetic domain wall dynamics obtained in Ta-CoFeB-MgO nanodevices with perpendicular magnetic anisotropy (PMA) and discuss the critical problems to be addressed for its implementation into a memory device. By using He⁺ ion irradiation to softly engineer interface intermixing, we will show that both the creep and the flow regime can be strongly affected by disorder. We will also demonstrate that Dzyaloshinskii-Moriya Interaction (DMI) can be induced by the presence of such interface disorder. Finally, we will focus on the strong influence of edge damages induced by the patterning process on DW dynamics.