



ΓΕΝΙΚΟ ΣΕΜΙΝΑΡΙΟ ΤΜΗΜΑΤΟΣ ΦΥΣΙΚΗΣ

PHYSICS COLLOQUIUM

Thursday, 24 November 2011

17:00 -18:00

3rd Floor Seminar Room

“Magnetic Soft X-Ray Microscopy: A Path towards Imaging Magnetism down to Fundamental Length and Time Scales”

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Abstract

One of the scientific and technological challenges in nanomagnetism research is to image magnetism down to fundamental magnetic length and time scales with elemental sensitivity in advanced multicomponent materials. Magnetic soft X-ray microscopy is a unique analytical technique combining X-ray magnetic circular dichroism (X-MCD) as element specific magnetic contrast mechanism with high spatial and temporal resolution. Fresnel zone plates used as X-ray optical elements provide a spatial resolution down to currently 10nm thus approaching fundamental magnetic length scales such as magnetic exchange lengths. Images can be recorded in external magnetic fields giving access to study magnetization reversal phenomena on the nanoscale and its stochastic character with elemental sensitivity. Utilizing the inherent time structure of current synchrotron sources fast magnetization dynamics such as current induced wall and vortex dynamics in ferromagnetic elements can be performed with a stroboscopic pump-probe scheme with 70ps time resolution, limited by the lengths of the electron bunches. With a spatial resolution approaching the <10nm regime, soft X-ray microscopy at next generation high brilliant fsec X-ray sources will make snapshot images of nanoscale ultrafast spin dynamics become feasible.