LABORATOIRE de CHIMIE PHYSIQUE – MATIERE et RAYONNEMENT
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Growth and magneto-optical characterization of magnetic thin films

Magnetic thin films play an important role in a range of commonly used devices such as computer hard disks or electronic components in mobile phones [1]. In order to further improve their performance (speed, energy consumption, etc.), our research team is studying the magnetization of magnetic thin films on ultra-short time scales using laser pulses [2-4]. The first step of our research is to grow magnetic thin films with well-defined static properties: crystal structure, direction and strength of magnetization, presence or absence of magnetic domains. These parameters are highly dependent on the growth conditions of the thin films [5].

The aim of the internship is to systematically characterize how the growth parameters influence the magnetic properties of our thin films. For this purpose, CoTb alloy thin films, Co/Pt multilayers or Fe thin films will be fabricated by magnetron sputtering and characterized by magneto-optical Kerr effect and atomic force microscopy. Special attention will be paid to the use of high temperature deposition, a new possibility of our deposition chamber.

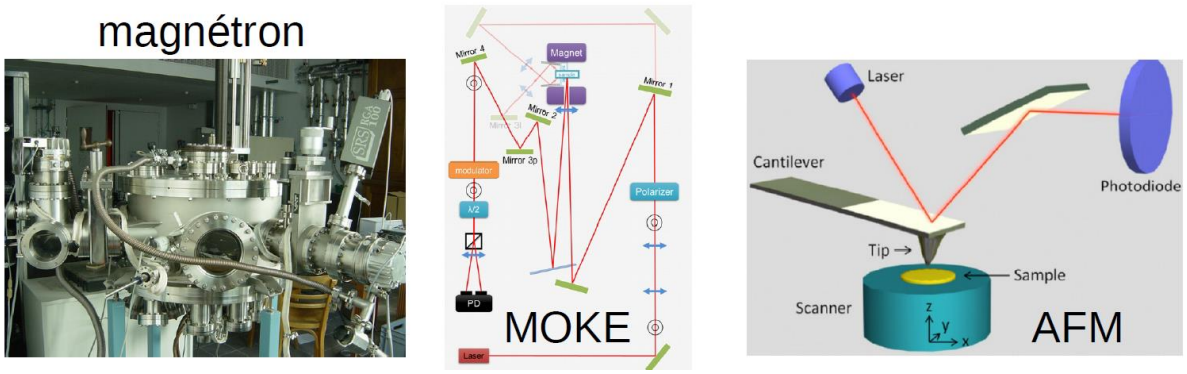

Figure 1 : Left: Photo of our magnetron sputtering chamber. Middle: Schematic of our Magneto-Optical Kerr Effect (MOKE) experiment. Right: Schematic diagram of the atomic force microscopy.

[1] Lau *et al.* J. Phys. D: Appl. Phys. 44 303001 (2011); http://stacks.iop.org/JPhysD/44/303001
[2] Chardonnet *et al.* Struct. Dyn. 8, 034305 (2021); https://doi.org/10.1063/4.0000109
[3] Hennes *et al.* Phys. Rev. B 102, 174437 (2020); https://doi.org/10.1103/PhysRevB.102.174437
[4] site web de l'équipe
[5] Vaz *et al.* Rep. Prog. Phys. 71 056501 (2008); http://stacks.iop.org/RoPP/71/056501

Used techniques

Sample growth by DC magnetron sputtering, characterization of magnetic properties by magneto-optical Kerr effect and atomic force microscopy.

Qualities of the candidates

The candidate should have a solid ground in physics and a strong taste for experimentation. Knowledge of magnetism will be particularly appreciated but not necessary.

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Hosting period

Start date : April-May End date : June-Jyuly

length : 3-4 months