

Licence Master 1 Master 2 Fin d' tudes

Nom du laboratoire / Laboratory name: Laboratoire de Physique des Gaz et des Plasmas - L.P.G.P.

Code d'identification: UMR 8578

Organisme / Institution: CNRS - Universit  Paris-Saclay

Adresse / Address: B t. 210 rue Henri Becquerel, 91405 Orsay Cedex

Site internet / website: www.lpgp.universite-paris-saclay.fr

Lieu de stage / Internship place: L.P.G.P., B t. 210, Campus Orsay Vall e

Responsable de stage / Internship supervisor

Nom / Last name: KAPRAN

Pr nom / First name: Anna

Courriel / E-mail address: anna.kapran@universite-paris-saclay.fr

T l. / Phone: 0169158190

Autres contacts / Other contacts:

Stage / Internship

Dur e / Duration: 3 weeks

Prise en charge du transport / Payment for transport: No

R mun ration / Scholarship: No

Intitul  de stage / Subject: Thin Film Technologies and Plasma Processes in Magnetron Sputtering Systems

R sum  / Summary: This internship offers hands-on training with magnetron sputtering systems, covering vacuum operation, plasma generation, thin film deposition, and basic characterization. It provides Bachelor-level students with a practical introduction to thin film technologies and experimental research in materials science and plasma physics.

Sujet de stage / Description

Plasma-based processes are at the heart of many high-tech industrial applications. It enables the production of high-quality, reproducible coatings which are commonly employed in microelectronics, semiconductor devices, optical components, automotive, aerospace, energy technologies and tooling industries. By depositing ultra-thin layers of material at the nanometer scale, it is possible to tailor a surface's electrical, optical, and mechanical properties, an approach widely used in advanced manufacturing and engineering. Among the different deposition techniques, *Physical Vapor Deposition (PVD)*, and especially *magnetron sputtering*, is one of the most important and versatile methods used in industry today. Thanks to its excellent control over material composition and film properties, magnetron sputtering is a key technology connecting fundamental research with industrial-scale production.

The objective of the internship is to introduce the student to thin film technologies through practical work with a magnetron sputtering system in a research laboratory environment. The internship is designed as a hands-on experience, allowing the student to discover how a vacuum system operates, how thin films are deposited, and how deposition parameters influence the final properties of the coating.

During the internship, the student will first become familiar with the basic principles of PVD sputtering, plasma generation, and vacuum technology. He/she will practice in the preparation of substrates, including cleaning and mounting procedures. The student will assist in thin film deposition experiments using two magnetron sputtering systems in LPQP and will learn how key plasma and process parameters affect film growth and quality. In addition, the student will perform basic characterization of the deposited films, including thickness measurements, optical characterization, and simple structural analysis.

By the end of the internship, the student will have gained a clear overview of thin film deposition process, practical experience with experimental equipment, and an introduction to scientific research methods in materials science and plasma technology.

The internship is suitable for a Bachelor / Licence-level student in physics, materials science, engineering, or a related field. No prior practical experience with PVD or thin films is required.