https://jmc2026.sciencesconf.org/

MSP05 - Études multi-échelles de la croissance de films minces

Organizers: HEMERYCK Anne (LAAS), FURGEAUD Clarisse (INL), MASTAIL Cédric (Institut Pprime)

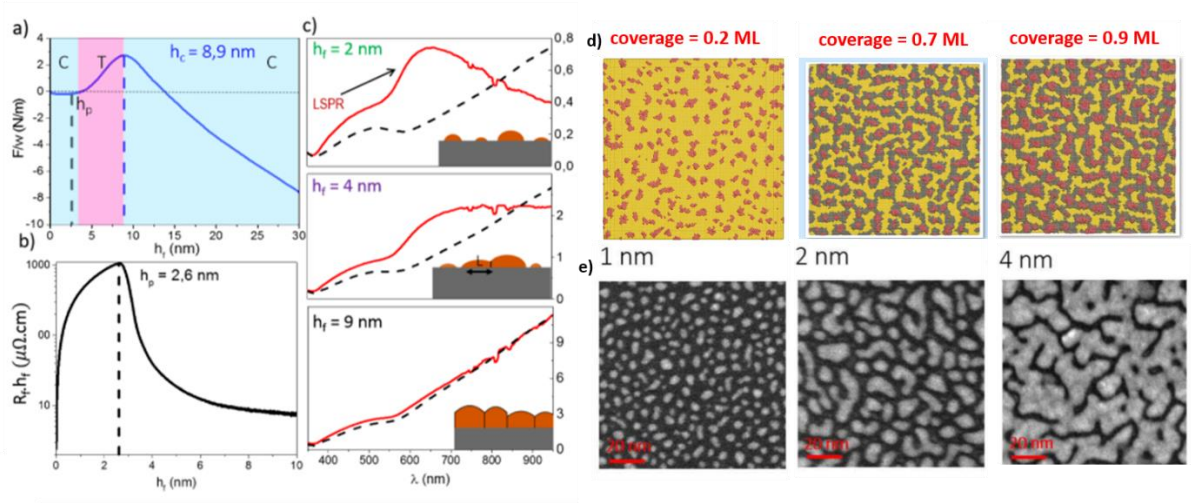
Sponsors: PEPR DIADEM CINEMA

Content:

Thin films are key components in modern technologies, being widely used in optics, micro- and optoelectronics, magnetism, mechanics, chemistry, biomedical devices, and decorative applications. Their functional properties strongly depend on composition, thickness, microstructure, grain size, metastable phase stabilization, and internal stress. Optimizing these properties therefore requires a detailed understanding of the relationships between deposition parameters, growth mechanisms, resulting microstructure, and film performance.

Multiscale approaches have become essential for investigating thin-film growth, whether epitaxial or non-epitaxial. By combining advanced deposition techniques, increasingly sensitive structural characterization tools, and state-of-the-art numerical simulations, researchers can now probe growth processes across atomic to macroscopic scales. In particular, kinetic Monte Carlo (kMC) simulations provide a powerful framework for linking atomistic mechanisms to mesoscale morphology, while DFT and molecular dynamics approaches enable detailed investigation of defects and grain boundaries. Experimentally, in operando and real-time techniques (XRD, GISAXS, optical monitoring, resistivity, substrate curvature, etc.), complemented by ex situ microstructural analyses, allow direct insight into the dynamic mechanisms governing film growth.

This mini-symposium aims to bring together researchers working on metallic, semiconductor, and functional thin films using multiscale approaches—whether experimental, numerical, or combined. The goal is to present the current state of the art and foster discussion on the latest methodological and conceptual advances in thin-film growth.



Multiscale study of the determination of characteristic thicknesses during the growth of Cu thin films deposited by magnetron sputtering, combining real-time in situ diagnostics (stress (a), resistivity (b), reflectivity (c)) and complementary morphological analysis (kMC, STEM).