



TTU DEPARTMENT OF PHYSICS AND ASTRONOMY
CONDENSED MATTER SEMINAR SERIES

**Controlling Epitaxial Growth: From
Physical Vapor Deposition to Materials
Physics**

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MON., SEPT. 28 AT 2:00 PM IN CHEM 101

Epitaxial thin-film growth provides a powerful route for creating crystalline materials with controlled composition, symmetry, strain, and interfaces. Achieving high-quality epitaxy, however, requires more than depositing material onto a single-crystal substrate. It involves controlling the arrival of atomic or molecular species, their chemical reactivity, surface diffusion and desorption, and their incorporation into a growing crystal.

In this technical talk, I will discuss practical approaches for controlling epitaxial growth using physical vapor deposition, with particular emphasis on molecular-beam epitaxy (MBE), together with examples from PLD and other complementary growth approaches. I will highlight how control of material flux, growth chemistry, substrate surfaces, and non-equilibrium growth conditions can be used to stabilize high-quality epitaxial films and explore new materials.

Beyond synthesis itself, high-quality epitaxial films provide an important platform for investigating fundamental materials physics. They can be directly integrated with momentum-resolved spectroscopy such as ARPES and synchrotron-based measurements, as well as high-field and low-temperature transport, magnetism, and studies of quantum and quantized transport phenomena. Through selected examples, I will illustrate how growth control, structural characterization, and physical-property measurements form a continuous experimental pathway from atomic-scale synthesis to emergent electronic states.

The broader objective of this talk is to present epitaxy not simply as a deposition technique, but as the experimental foundation connecting materials synthesis, advanced characterization, and condensed-matter physics.

To be notified regarding future seminars, email Prof. Wade DeGottardi wdegotta@ttu.edu.