PhD Course in Materials Science and Nanotechnology

Chemical and physical methodologies for nanosystems (3 CFU)

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Program

- **Overview of surface and thin films characterization methods.**

- **X-ray photoelectron spectroscopy (XPS):**
  - Basic principles
  - Instrumentation
  - Experimental setup
  - Data interpretation
  - Applications in material science and nanotechnologies

- **Auger electron spectroscopy**
  - Basic principles
  - Instrumentation
  - Experimental setup
  - Applications in material science and nanotechnologies

- **Time-of-flight Secondary Ion Mass Spectrometry (ToF-SIMS):**
  - Basic principles
  - Instrumentation
  - Experimental setup and operational mode (surface SIMS, depth profiling, imaging)
  - Data interpretation
  - Applications in material science and nanotechnologies
  - ToF-SIMS laboratory: surface analysis, depth profiling, imaging, data treatment.

- **References:**
  - D. Briggs, J. T. Grant; Surface Analysis by X-ray and Auger Electron Spectroscopy; Surface Spectra – IM Publications
  - J. Vickerman, D. Briggs; ToF-SIMS: Surface Analysis by Mass Spectrometry; Surface Spectra – IM Publications
  - Research papers/reviews will be provided during the lectures.