

Thesis Proposal for the Master's Degree in Physics

Gruppo "Superfici e Energia"

Ref. Prof. Raffaele G. Agostino

The Surface and Energy research group at the University of Calabria, led by Raffaele G. Agostino, focuses on studying materials with innovative chemical-physical properties for both fundamental and applied purposes, such as energy and electronics. The team, consisting of researchers and collaborators, utilizes **advanced spectroscopic and microscopic techniques** (HREELS, XPS, UPS, SEM, etc.) to characterize surfaces and interfaces. Currently, they are involved in building the **STAR X-ray source** for advanced microtomography and spectroscopy studies. Their main research areas include gas adsorption in nanostructured materials, the characterization of self-assembled molecular layers, the analysis of two-dimensional systems like graphene, and the development of advanced tomographic imaging techniques. Additionally, the group contributes to the **DeltaH laboratory** for hydrogen storage solutions and conducts pioneering research in **virtual histology** using **artificial intelligence** techniques for tissue analysis.

Title:

Non-Invasive Archaeometric Investigation of Manufacts Using X-ray Techniques

Abstract:

This thesis explores the application of X-ray fluorescence (XRF) and X-ray microtomography (μ -CT) to study ancient finds from the Brettii and Enotri Museum in Cosenza, Calabria. Many of these finds exhibit heavy alteration from prolonged burial, obscuring inscriptions and other details. By utilizing non-invasive X-ray techniques, this study aims to identify the material composition of the coins and reveal hidden inscriptions, thereby providing valuable information on their historical provenance. The results are integrated with numismatic analyses to place the coins in their archaeological and temporal context, demonstrating the potential of μ -CT in conservation science.

Supervisor(s):

Vincenzo Formoso, Raffaele Agostino

E-mail(s):

vincenzo.formoso@unical.it

raffaele.agostino@fis.unical.it

Laboratory where the thesis is carried out:

μ Tomo/SoftX-STAR in collaboration with Brettii and Enotri Museum in Cosenza and Soprintendenza archeologia

Type of thesis:

Experimental and data analysis