

# **“Nonlinear optical microscopy: a non-destructive tool for characterization of Cultural heritage materials”**

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## **Abstract**

Nonlinear optical microscopies (NLOM) are state-of-the-art, non-invasive imaging techniques, initially developed in the field of biomedical optics, that allow surface mapping and profiling of multilayer, multicomponent structures of solid substrates. In NLOM, the nonlinear optical response from the material is induced by excitation with a near infrared, ultrafast femtosecond laser. Different modalities of the technique, such as Multi-Photon Excited Fluorescence and Second or Third Harmonic Generation, provide non-destructive, accurate structural information of substrates and objects and of their composition as a function of depth.

NLOM has been recently introduced in the field of cultural heritage, profiting from its non-invasive capabilities that enable characterization and diagnostics without unwanted side effects, i.e. photobleaching and/or phototoxicity damage. In this talk, after introducing the basic concepts of NLOM, examples of applications to different kinds of heritage materials will be shown, with emphasis in painting layers and historical glasses. The advantages of this approach, together with its limitations, will be discussed by comparing with other more established techniques for analysis of artworks and heritage objects.

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