

SEQUENTIAL COHERENT INTERFEROMETRIC RECORDING: A KEY TO MONITOR STRUCTURAL ALTERATIONS IN INTERVENTIVE RESTORATION

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In Cultural heritage preservation there are many interventive procedures which affect in short and long term the structural integrity of artworks under restoration. The effect of excimer laser ablation utilized in paintings restoration, consolidation processes and cleaning treatments are currently mostly performed based on operator's experience. However modern practices utilising laser optical coherent interferometry have been proved promising candidates to reveal inborn defects, stressing areas and material fatigue in terms of structural deterioration, destabilisation of structures and disintegration of interfaces with subsequent loss of adhesion and detachment generation.

In this presentation an exemplary review of applying optical holographic interferometry and holographic speckle interferometry are presented.

They are applied to monitor in semi-real-time or real-time the dimensional changes which may be generated during artwork interventive conservation. A study by means of sequential recording of holographic interferograms on model samples is provided. In ablation processes, reversibility is assessed versus a reference displacement before ablation established by means of a controlled experimental methodology. This is determined according each distinctive initial state of sample prior to ablation.

The long-term sequential recording enables comparison between temporally resolved optical wave fronts scattered before, after and during the selective ablation of material. Thus, comparative structural monitoring of laser-induced photomechanical effects that may result in potential damage is accomplished. Results and discussion of consolidation treatments in paintings and environmental stimulations on humidity sensitive materials are also included.