

PROGRAMME AND ABSTRACTS

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Programme and Abstracts

Edited by

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A study of the effect of 1064 nm Nd-YAG laser cleaning of gilding wood support

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The results of a study on the efficiency and feasibility of 1064 nm pulsed laser cleaning of gilding on wood support are reported. The conditions for the optimization of this technique have also been analyzed.

Ninety 4 x 4 cm test samples of gilding on wood have been made for this study. A half of the samples are of pure gold and another half of brass leaf. Three types of adhesives have been used to bond gold leaves to substrate: water based mixtion, oil based mixtion and fish glue.

Four types of protecting coatings and one patina have been applied on these samples: Titan satin varnish, shellac, microcrystalline wax – Paraloid B-72®, Paraloid B-72® and bitumen.

Repainting with purpurin has been applied to a half of the samples. Several types of dirt have been deposited on these samples: virgin wax candle smoke, paraffin wax candle smoke, virgin wax deposit and paraffin wax and dust deposit.

Starting from some initial parameters, the effect of laser cleaning on the samples has been assessed. Optimal results have been found for 75mJ-20Hz, 50mJ-20Hz y 35mJ-20Hz.

To assess the cleaning and to characterize the materials the following techniques have been applied: colorimetry, optical microscopy, stereomicroscopy, scanning electron microscopy and FTIR spectroscopy. Additionally, the temperature and heat diffusion on the gilding caused by laser pulses have been analyzed by means of a thermal imaging camera.

Finally and basing on the results for the test samples a study on real artwork has been performed.

As a conclusion, for both kinds of tested smoke dirt, virgin and paraffin, laser cleaning has been effective although with nonuniform results. It is not even sure that the optimal values on one region of the sample work properly on other region of the same sample. Nd-YAG laser cleaning has not been effective neither for the removal of waxes, both virgin and paraffin, on gilding nor for the dust dirt simulated in this project.

For the real artwork the results are similar to those previously observed on test samples. Very heterogeneous results are found, finding both cleaned regions and damaged regions (gilding loss, whitening and bulging).

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