PHOTONICS PUBLIC PRIVATE PARTNERSHIP

Photonics 4 Cultural Heritage
Photonics empowering Cultural Heritage
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POLITECNICO MILANO 1863

A novel Hyperspectral Camera for multimodal and multiscalar imaging of Cultural Heritage objects

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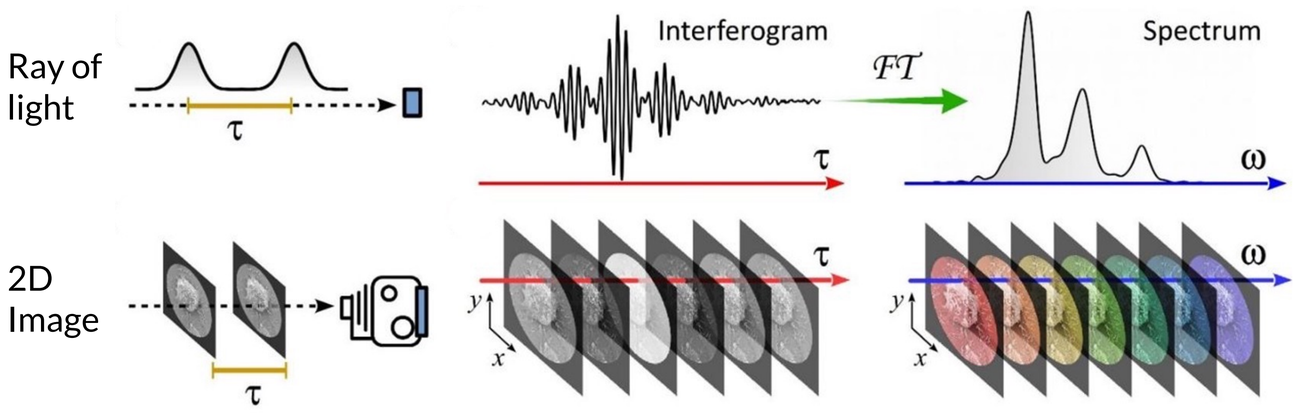
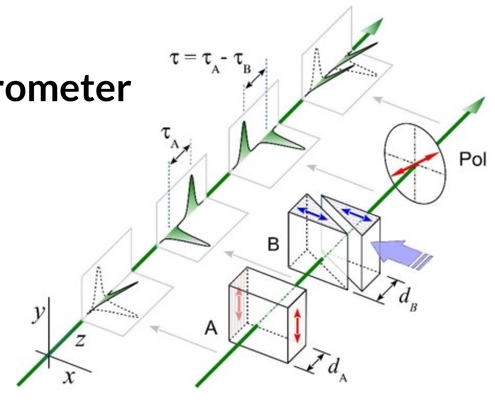
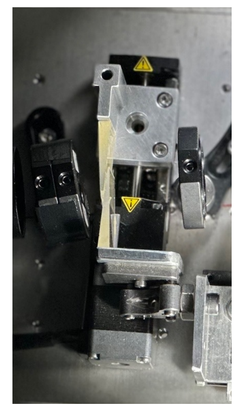
HOW THE HYPERSPECTRAL CAMERA WORKS?



through

TWINS interferometer

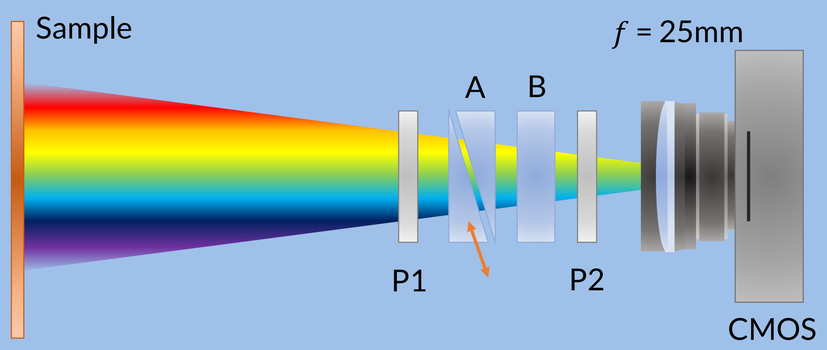




Based on the **light source** and **detection camera** it is possible to measure

REFLECTANCE | **CONTINUOUS WAVE PHOTOLUMINESCENCE** | **TIME GATED PHOTOLUMINESCENCE**

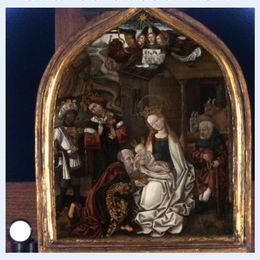
LARGE FOV



Minimum FOV: 30cm x 30cm → To identify pigment in painting

REFLECTANCE

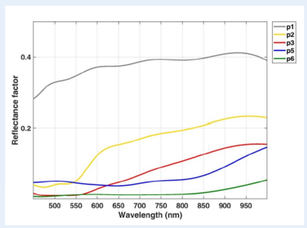
Reconstructed RGB



Panel painting from C2RMF collection

In collaboration with:

CENTRE DE RECHERCHE ET DE RESTAURATION DES MUSÉES DE FRANCE

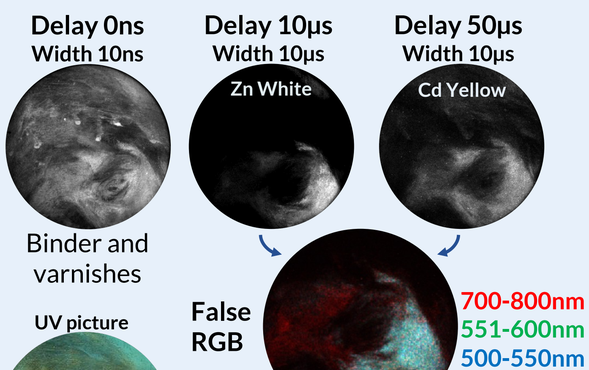


TIME GATED PHOTOLUMINESCENCE

Painting *Madre*, P.Verzetti

In collaboration with:
M. Pinelli V. Parodi

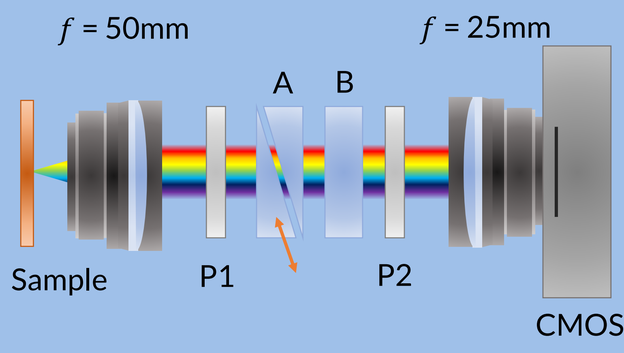
BRERA ACCADEMIA DI BELLE ARTI



Delay 0ns Width 10ns — Binder and varnishes
Delay 10µs Width 10µs — Zn White
Delay 50µs Width 10µs — Cd Yellow
False RGB — 700-800nm, 551-600nm, 500-550nm
UV picture — Area analyzed

MACRO

Hyperspectral camera coupled to **2 photographic objectives** to perform **macroscopic** imaging

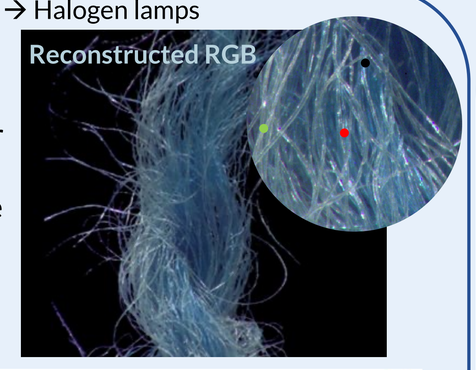


FOV: 15mm x 15mm → To study small details of artworks.

REFLECTANCE

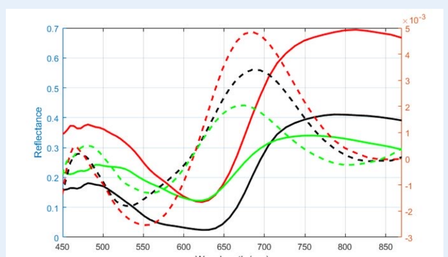
→ Halogen lamps

Investigate dyed wool yarns and their aging ***in situ***, dyed with Indigo Carmine and aged for 305 h



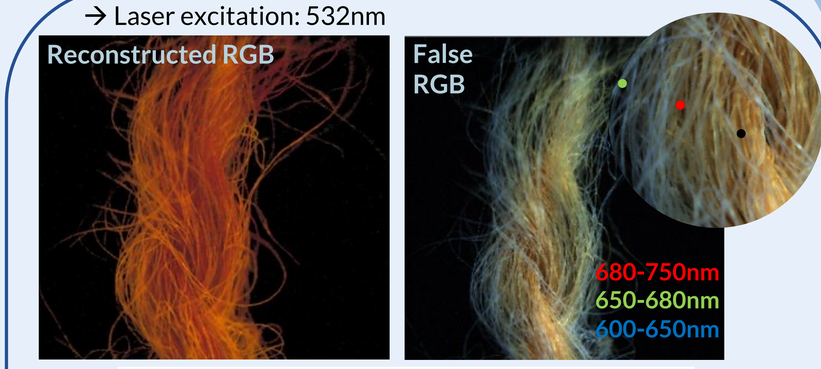
In collaboration with:
Z. Li, E. Catelli, G. Sciutto, S. Prati,

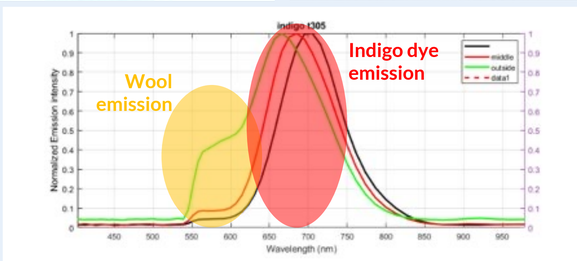
ALMA MATER STUDIORUM UNIVERSITÀ DI BOLOGNA A.D. 1088



PHOTOLUMINESCENCE

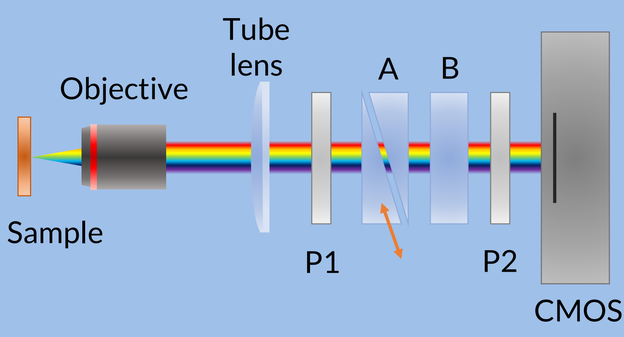
→ Laser excitation: 532nm





MICRO

Hyperspectral camera coupled to a **standard microscope** to perform diffuse reflectance and photoluminescence analysis of **µ-samples**



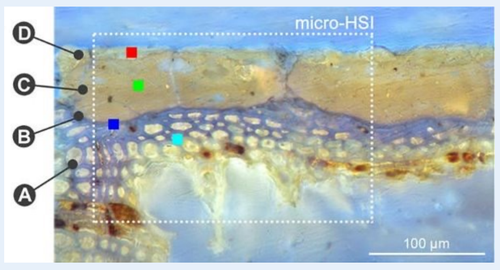
Typical FOV: 100µm x 100µm → To identify materials in cross section

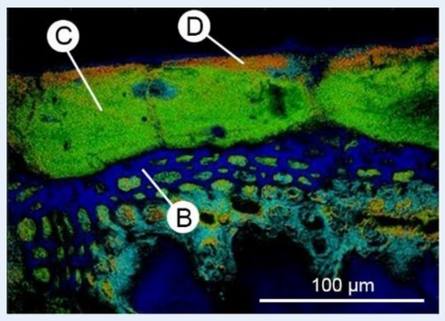
PHOTOLUMINESCENCE

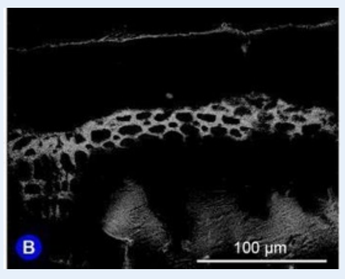
Investigate cross section of *Violino piccolo "Bracco"*, *Storioni L., 1793*

In collaboration with:
M. Albano, G. Fiocco, M. Malagodi

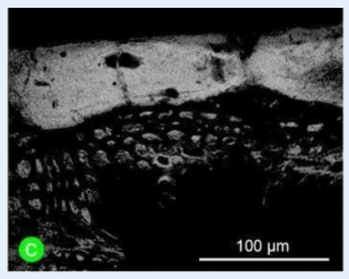
UNIVERSITÀ DI PAVIA Laboratorio Arvedi di Diagnostica non Invasiva



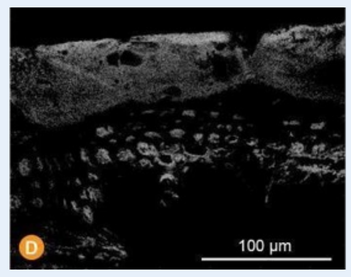




Sizing-proteinaceous



Varnish-resinous



Uppermost area-resinous

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