Towards a multi-technique device for cultural heritage applications

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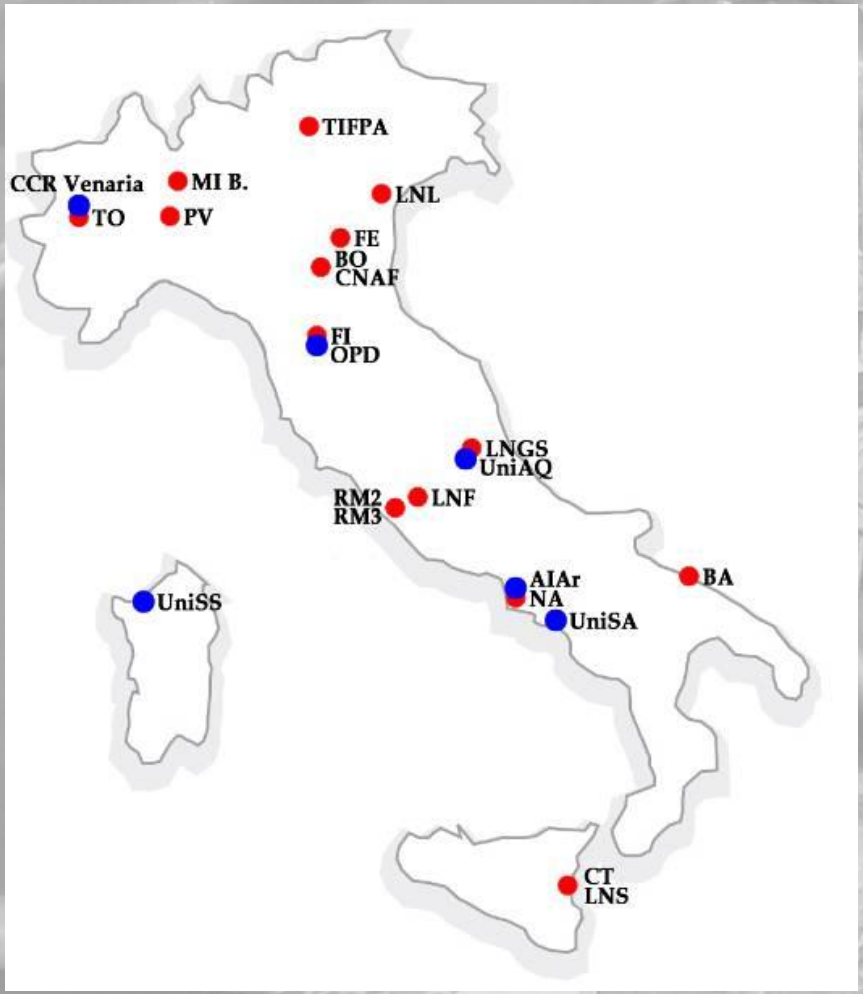
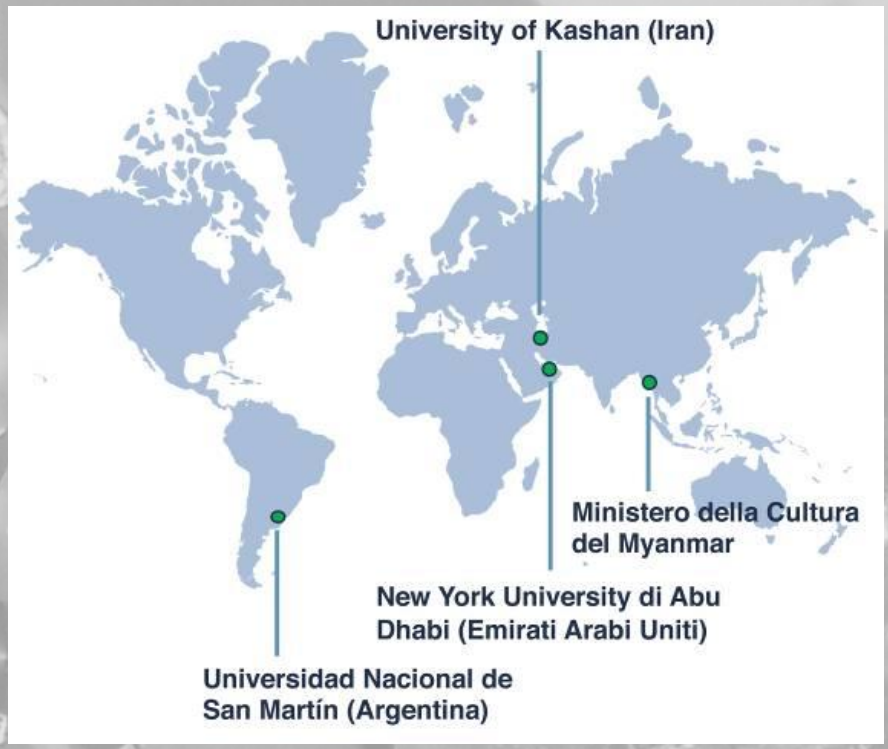
The INFN-CHNet collaboration





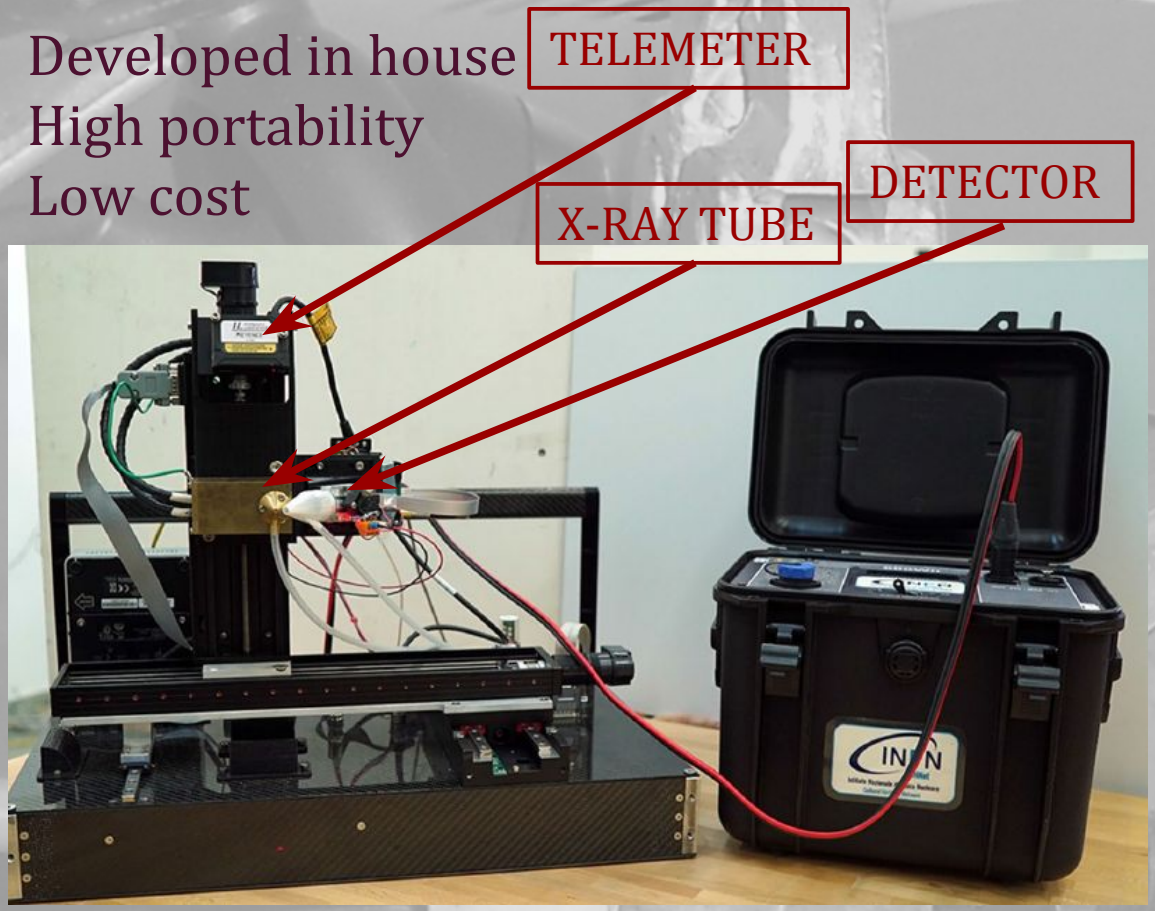
http://chnet.infn.it/en/home-3/

The **network of INFN** aimed at developing instruments, methods and technologies for **Cultural Heritage related projects**

The INFN-CHNet MA-XRF scanner

The INFN CHNet has developed an XRF-scanner for in-situ analyses

Developed in house
High portability
Low cost



Moxtek X-Ray tube
Amptek SDD detector
PI Motor stages
CAEN Digitizer
Keyence Telemeter

Taccetti, F. et al. Rend. Lincei Sci. Fis. Nat. 2019, 30, 307–322

Elemental analysis + scanning → Elemental map

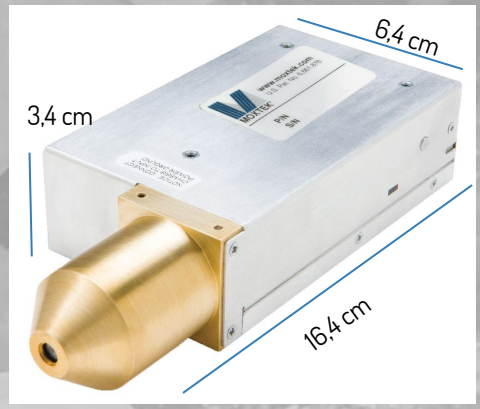
Multi-technique device

Thanks to the versatility of the MA-XRF scanner and to the expertise present within the INFN-CHNet collaboration, a continuous upgrade is carried out

Among others, the development of a multi-technique device is under study

Different X-Ray based techniques using one X-Ray source

- X-Ray Fluorescence (XRF)
- X-Ray Luminescence (XRL)
- X-Ray Radiography (RX)

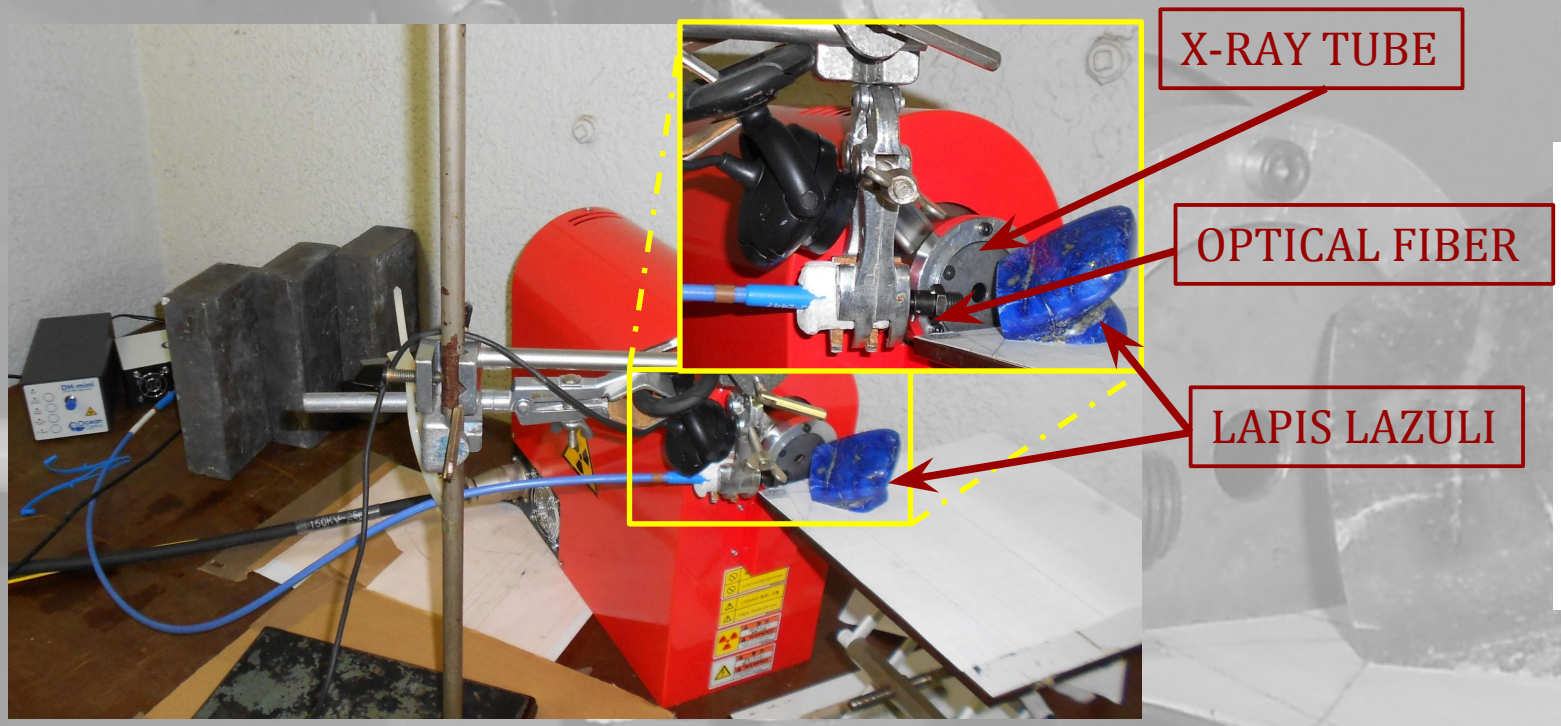


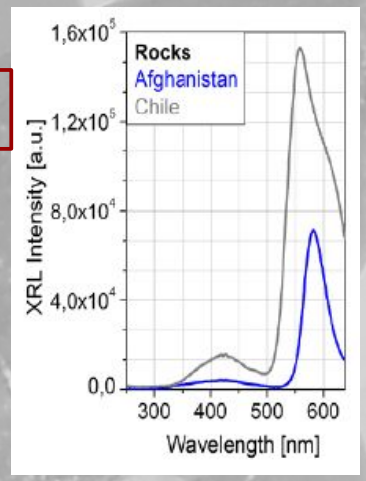
Moxtek 60kV 12W MAGPRO

X-Ray Luminescence

Luminescence induced by X-Rays

Example in the field of Cultural Heritage:
Provenance of lapis lazuli can be identified thanks to their XRL signals





Re, A. et al. EPJ Plus 2018, 133, 362

X-Ray Radiography

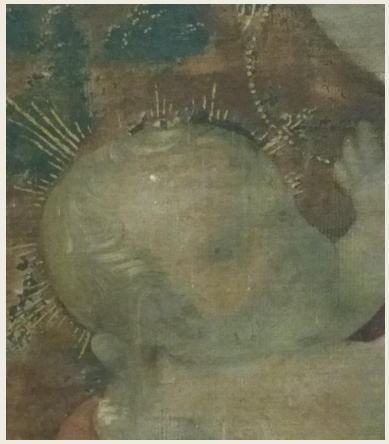
Flat-Panel detector

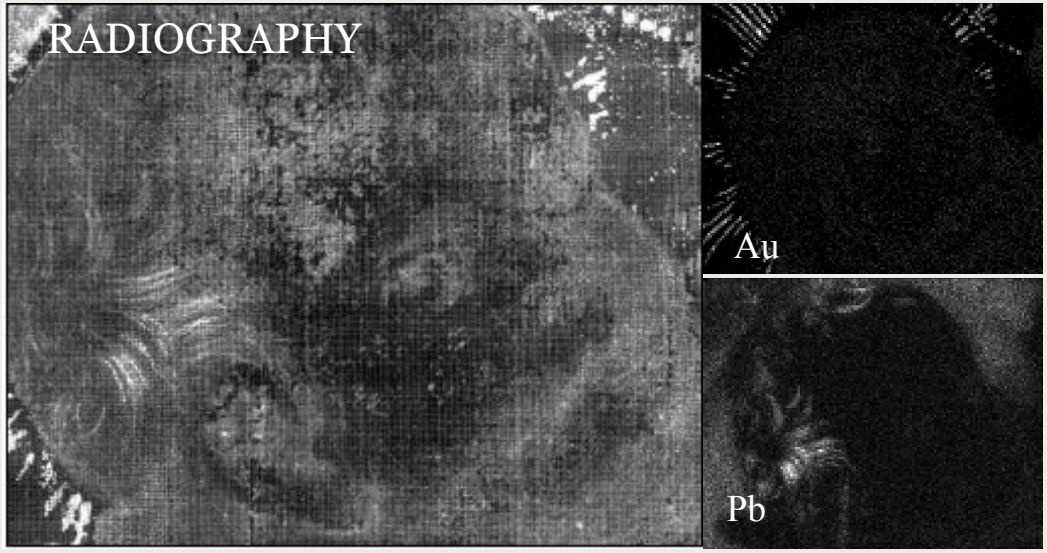
Active Area:
11,4 cm x 14,6 cm
Spatial resolution:
49.5 μm
Pixel:
CsI

The Flat-Panel detector, part of the NEXTO project funded by the Compagnia di San Paolo, was tested on wood mock-ups

Combining XRF and RX

The XRF and the RX techniques were used on a tempera on canvas at the CCR “La Venaria Reale”





MA-XRF
Elemental distribution of the painting layer

X-Ray RADIOGRAPHY
Spatial distribution of the painting layer

Thank you for your attention

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