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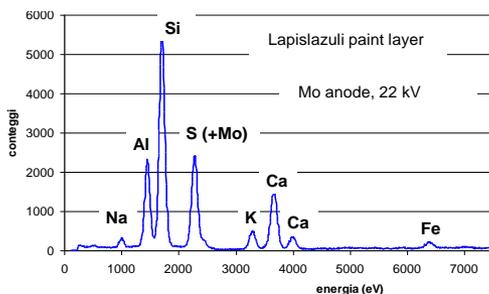
Portable XRF with detection range down to low Z's

RESEARCH ACTIVITY

XRF is a well-known technique of compositional analysis, which can be made portable; however, for a number of reasons (physical, but also instrumental) it usually has a severe limitation in the detection of low-Z elements, besides other analytical problems. At LABEC we worked to overcome these limitations and for an overall improvement of XRF performance when operating with portable instrumentation. We are also presently testing a new configuration to obtain compositional maps from portable XRF

RESEARCH GROUP

Istituto Nazionale di Fisica Nucleare (INFN)– Sezione di Firenze – Laboratorio LABEC



XRF using the LABEC spectrometer, showing the good sensitivity to low-Z elements detection



The measurement head of the XRF spectrometer of LABEC



The instrument while measuring on Giotto's frescoes at the Bardi Chapel of Santa Croce, Florence

RESULTS/PRODUCTS

Also thanks to the experience gained in 25 years of activity with PIXE, the group already built a portable spectrometer extending the range of elements detectable with good efficiency down to sodium included. The instrument is based on a measuring head with two X ray tubes with thin exit windows, and He flow in front of both the tubes and the detector. The support system provides the possibility of large head movements, thus making e.g. easily possible the analysis of large-size frescoes.

APPLICATIONS PERFORMED

In the course of the past couple of years, thanks to numerous collaborations, in particular with the Opificio delle Pietre Dure, measuring campaigns have been e.g. performed on: wall paintings by Giotto, in the Bardi and Peruzzi Chapels, Santa Croce (Florence); the large Crucifix by Maestro da Figline (altar of Santa Croce); painting on wood "Madonna del Granduca" by Raffaello; wall painting of Resurrection, by Piero della Francesca (Sansepolcro); XIV century frescoes in the crypt of S.Colombano (Bologna)