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The Importance of Being Versatile: INFN-CHNet MA-XRF Scanner on Furniture at the CCR “La Venaria Reale”

Leandro Sottili ^{1,2}, Laura Guidorzi ^{1,2} , Anna Mazzinghi ^{3,4}, Chiara Ruberto ^{3,4}, Lisa Castelli ⁴, Caroline Czelusniak ⁴, Lorenzo Giuntini ^{3,4} , Mirko Massi ⁴ , Francesco Taccetti ⁴, Marco Nervo ⁵ , Stefania De Blasi ⁵, Rodrigo Torres ⁶, Francesco Arneodo ⁶, Alessandro Re ^{1,2,*}  and Alessandro Lo Giudice ^{1,2}

- ¹ Dipartimento di Fisica, Università degli Studi di Torino, Via Pietro Giuria 1, 10125 Torino, Italy; leandro.sottili@unito.it (L.S.); laura.guidorzi@unito.it (L.G.); alessandro.logiudice@unito.it (A.L.G.)
 - ² Istituto Nazionale di Fisica Nucleare (INFN), Sezione di Torino, Via Pietro Giuria 1, 10125 Torino, Italy
 - ³ Dipartimento di Fisica e Astronomia, Università degli Studi di Firenze, Via Giovanni Sansone 1, Sesto Fiorentino, 50019 Firenze, Italy; anna.mazzinghi@unifi.it (A.M.); ruberto@fi.infn.it (C.R.); lorenzo.giuntini@unifi.it (L.G.)
 - ⁴ Istituto Nazionale di Fisica Nucleare (INFN), Sezione di Firenze, Via Giovanni Sansone 1, Sesto Fiorentino, 50019 Firenze, Italy; castelli@fi.infn.it (L.C.); czelusniak@fi.infn.it (C.C.); massi@fi.infn.it (M.M.); taccetti@fi.infn.it (F.T.)
 - ⁵ Centro Conservazione e Restauro “La Venaria Reale”, Piazza della Repubblica, Venaria Reale, 10078 Torino, Italy; marco.nervo@centrorestaurovenaria.it (M.N.); stefania.deblasi@centrorestaurovenaria.it (S.D.B.)
 - ⁶ Division of Science, New York University Abu Dhabi, P.O. Box, Saadiyat Island, Abu Dhabi 129188, United Arab Emirates; rodrigo.torres@nyu.edu (R.T.); francesco.arneodo@nyu.edu (F.A.)
- * Correspondence: alessandro.re@unito.it



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Abstract: At present, the use of non-destructive, non-invasive X-ray-based techniques is well established in heritage science for the analysis and conservation of works of art. X-ray fluorescence (XRF) plays a fundamental role since it provides information on the elemental composition, contributing to the identification of the materials present on the superficial layers of an artwork. Whenever XRF is combined with the capability of scanning an area to provide the elemental distribution on a surface, the technique is referred to as macro X-ray fluorescence (MA-XRF). The heritage science field, in which the technique is extensively applied, presents a large variety of case studies. Typical examples are paintings, ceramics, metallic objects and manuscripts. This work presents an uncommon application of MA-XRF analysis to furniture. Measurements have been carried out with the MA-XRF scanner of the INFN-CHNet collaboration at the Centro di Conservazione e Restauro “La Venaria Reale”, a leading conservation centre in the field. In particular, a chinoiserie lacquered cabinet of the 18th century and a desk by Pietro Piffetti (1701–1777) have been analysed with a focus on the characterisation of decorative layers and different materials (e.g., gilding in the former and ivory in the latter). The measurements have been carried out using a telemeter for non-planar surfaces, and with collimators of 0.8 mm and 0.4 mm diameter, depending on the spatial resolution needed. The combination of the small measuring head with the use of the telemeter and of a small collimator has guaranteed the ability to scan difficult-to-reach areas with high spatial resolution in a reasonable time (20 × 10 mm² with 0.2 mm step in less than 20 min).

Keywords: MA-XRF; conservation studies; furniture; Pietro Piffetti; chinoiserie lacquered cabinet

1. Introduction

X-ray fluorescence (XRF) is well established in the non-destructive, non-invasive analysis for the conservation, characterisation and prevention of works of art [1–5]. Whenever it is associated with the ability to scan an area, XRF provides the elemental composition related with the spatial distribution of the scanned area, and it is typically referred as macro X-ray fluorescence (MA-XRF) [1,4,6]. The MA-XRF technique is widely in use in the