Searching for Galileo's lost portraits with MA-XRF imaging spectroscopy.

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Galileo Galilei (1564-1642) grew up in a Renaissance environment. He was a musician, a writer and a painter as consensually recorded in all first biographies. As it was the custom of the nobles of his time, he loved being portrayed and in fact there are several artworks painted by Domenico Tintoretto, Furini, Leoni Passignano, and the most famous ones made by Sustermans in the last years of his life. Many other portraits of Galileo of which records exist are lost.

In this work we present the results of a technical investigation of two paintings that have been suggested to be possible portraits of Galileo. The analysis has been performed by using a novel XRF scanner (named LANDIS-X) based on a real-time technology and allowing a fast scanning of paintings combining MA-XRF and micro-XRF techniques [1].

The first painting is the *Portrait of a bearded man* attributed to Jacopo Robusti called Tintoretto (1519-1594). It is a 35x30 cm oil-on-canvas belonging to the collection of the Museum of Medieval and Modern Art of Padua (Italy). Only the face of a middle-aged man, with the head partially incomplete is depicted. Recently, it has been suggested that this painting could be instead the lost portrait of Galileo made by the Tuscan painter Santi di Tito (1536-1603) in 1601/1602 [2].

The second painting comes from a private collection in Trieste (Italy). The painting is a half-length portrait of an unknown man dressed in black, turned slightly to the left, but looking directly at the observer. The author of the painting (oil on canvas 87 x 69 cm) is unknown. The identification of the gentleman as a young Galileo is based on the resemblance to the portrait by Domenico Tintoretto (1560-1635) of 1604-1608. The painting was initially studied within the framework of the project FACES (Faces, Art, and Computerized Evaluation Systems) in which the most sophisticated face recognition technology is applied to works of art [3].

Elemental distribution images obtained by the XRF imaging investigation allowed us to better elucidate pigment nature and painting technique in the artworks. Different pictorial details emerged during the scanning and at least in one case support the attribution of the depicted subject to Galileo.

[1] F.P. Romano et al., Journal of Analytical Atomic Spectrometry 32 (2017) 773-781
[2] P. Molaro, Journal of Astronomical History and Heritage 19 (2016) 255-264
[3] R. Srinivasan, C. Rudolph, A.K. Roy-Chowdhury. Computerized Face Recognition in Renaissance Portrait Art. IEEE Signal Processing Magazine, 32, (2015) pp. 85.