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Portable XRF application in archaeometric studies on polychromic surfaces: the example of the 15th century painted marbles from Santa Maria di Castello (Genoa, Italy).

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This work is the result of a research carried out on some painted marble artifacts on show at the museum of the Dominican complex of Santa Maria di Castello, in the historical center of Genoa. The project was a university degree thesis but it was also part of a bigger doctorate research on painted stones in Liguria.
The most important artifact analysed was a statue of Madonna and Child sculpted by Domenico Gagini around 1453 and completely painted; other items considered in our research were a portal and a garland, both from the 15th century, which present some painted areas and were realized by Leonardo Riccomanni and Domenico Gagini.
The aim of this work was to study the technique employed in painted stones: we made hypotheses on the possible existence and composition of the preparatory layer, analysed the kind of pigments used and searched for evidence of old restoration works.
Our research was carried out with non-invasive diagnostic methods, a choice that was mostly due to the good state of preservation of the artifacts. Consequently, we decided to use the portable XRF technique, which allowed us to analyse the items without collecting samples and without moving them from their original site. Moreover, compared to invasive techniques which require the taking of samples, the XRF method makes it possible to take more measurement points, so that we were able to analyse all the different polychromic areas of the artifacts and to study all the different pigments which had been used.
Thanks to this kind of analysis, it was possible to make hypotheses about the chemical composition of the materials used for the realization of these works of art and to characterize an area which had been restored in the past.
This research highlights the potentials as well as the limits of the XRF technique. As a matter of fact, during the analytic work we identified in the artifacts some areas about which the XRF analysis left some doubts, requiring an integration with micro-invasive techniques. However, it is important to underline the effectiveness of XRF as a preliminary method, capable to give exhaustive answers to many questions, as clearly emerged during this project, but also to identify any areas which might need further analysis, limiting the number of samples to be taken and reducing to a minimum any invasive intervention on valuable artifacts.