

# Experimental report

10/06/2026

**Proposal:** 1-03-62

**Council:** 4/2023

**Title:** Characterization of the manufacturing method of the *¿Torso da Livorno¿* from Museo Archeologico Nazionale di Firenze (MAF)

**Research area:** Materials

**This proposal is a new proposal**

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**Samples:** bronze sculpture Cu-Sn-Pb

| Instrument | Requested days | Allocated days | From                     | To                       |
|------------|----------------|----------------|--------------------------|--------------------------|
| NEXT       | 2              | 4              | 11/09/2023<br>23/06/2024 | 13/09/2023<br>25/06/2024 |

## Abstract:

In this experiment we propose to investigate, by neutron tomography, a life-size Greco-Roman bronze torso from the collection of the Museo Archeologico Nazionale di Firenze (MAF), in order to characterize the microstructural features related to the casting process. Following stylistic comparisons, assessment of the archaeological context, and visual investigation, this artwork was identified as a very important example of indirect lost wax casting method. A morphological and microstructural analysis of the entire volume will confirm and reveal the presence of morphological features that would support these hypotheses. Neutron Imaging is the best and actually the only technique to obtain such a result and to provide mapping of the state of conservation of the entire artefact in a totally non-invasive way.

## Characterization of the manufacturing method of the “Torso da Livorno” from Museo Archeologico Nazionale di Firenze (MAF)

In this experiment we proposed to investigate, by neutron tomography, a life-size Greco-Roman bronze torso from the collection of the Museo Archeologico Nazionale di Firenze (MAF), in order to characterize the microstructural features related to the casting process. This artwork was identified as a very important example of indirect lost wax casting method.

Neutron Imaging was used to provide mapping of the state of conservation of the entire artefact in a totally non-invasive way, and help guide the restorers in the consolidation and cleaning interventions.



Figure 1. WB neutron radiography (stitched) of the statue from which all repairs were identified.

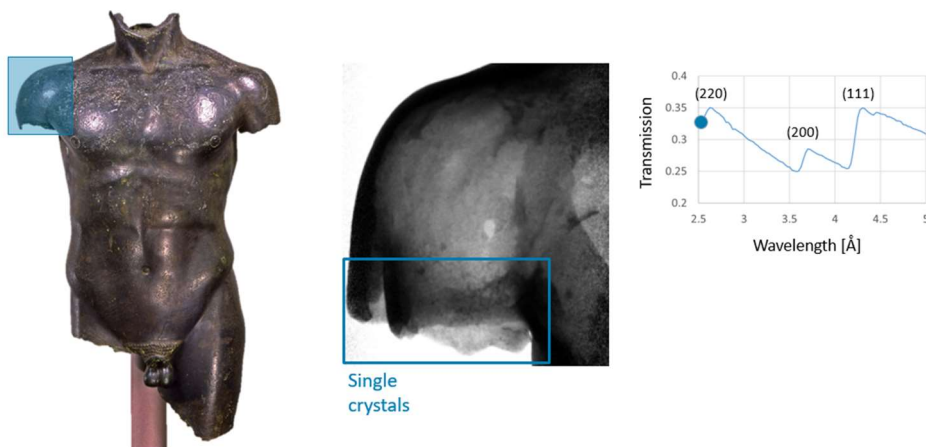


Figure 2. Bragg edge neutron transmission images showing metal composition and large single crystals in the area where arms were attached.