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## Neutron imaging, a key scientific analytical tool for the Cultural Heritage project at ANSTO

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A strategic scientific research project Cultural Heritage has been initiated at the Australian Nuclear Science and Technology Organisation (ANSTO). The project aims to promote the access to the suite of nuclear methods available across the organisation, and the use of a non-invasive analytical approach in the field of cultural-heritage, archaeology, and conservation science. The latest scientific analytical tools, which are available under the operation of ANSTO, including neutron-, synchrotron- and accelerator-based techniques, have been increasingly demanded for a wide range of applications to heritage materials.

Neutron Imaging (NI), in particular, has become a valuable means for research in these fields. The fundamental properties of the neutron – no electric charge, deep penetration power into matter, and interaction with the nucleus of an atom rather than with the diffuse electron cloud – make this sub-atomic particle the ideal probe to survey the bulk of a variety of heritage materials, such as metals, pottery, paintings, etc.

In collaboration with Australian museum institutions and universities, and international experts, a series of forensic studies involving the neutron imaging beamline DINGO1 at the Australian Centre for Neutron Scattering (ACNS) will be showcased. NI was successfully used to characterise the structure, morphology and composition of cultural heritage objects without the need for sampling or invasive procedures. When integrated by complementary methods, NI data were able to shed light on the most advanced manufacturing processes developed by different cultures over time, determine the authenticity of work of art or provide information on the conservation status.

### References

1 Garbe, U; Randall, T; Hughes, C; Davidson, G; Pangelis, S and Kennedy, SJ, A New Neutron Radiography / Tomography / Imaging Station DINGO at OPAL, Physics Procedia 69, 27-32 (2015)

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