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Contribution to the knowledge about cultural heritage objects by means of neutron and X-ray investigations

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Objects from cultural heritage have to be investigated mainly non-destructively or even non-invasively. In this respect, X-ray radiography has been used as a valuable and effective method since decades. The method provides art historians and experts active in cultural heritage studies with facts of interests to complete their vision of the studied topic.
In the talk, we want to introduce neutron imaging as an alternative tool for non-invasive material studies in respect to different classes of cultural heritage objects. Its power is given by the alternative attenuation behavior of neutrons in comparison to X-rays, where most of the heavy metals get transparent but organic materials show a high contrast due to the neutron scattering at hydrogen.
In some cases, neutron imaging is the only method to get the needed information either given by the transmission ability of neutrons or the high contrast from light elements, which are not visible with X-rays.
For other objects X-ray and neutron imaging can be applied sequentially and complementary at our beam line NEUTRA.
We will provide some general findings from our long-term collaboration with museums partners who have often a different research approach. Natural scientific facts are only one part in the puzzle within cultural heritage research.
In our presentation, we will report about successful studies covering a lead-sealed violinist sculpture from Spain by the famous artist Pablo Gargallo, a stony altar table from Fribourg (CH), Tibetan Buddha sculptures from 15th century, casting attempts from experimental archaeology, combined utilization of X-ray and neutron tomography on a medieval sword recovered from Lake Zug (CH) and the study of block excavation from a Swiss region. The presented studies will give an overview on the broad spectrum of cultural heritage topics, which can be studied using neutron imaging methods.
The results should encourage potential users of neutron imaging to perform trials at our beam lines and to understand the potential for future dedicated studies.

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