

# Current status of neutron radiography in Thailand

*Monday, 9 September 2013 18:00 (3 hours)*

For the past few years, neutron radiography in Thailand has been dramatically developed since the IAEA Co-ordinated Research Project titled “Application of 3D Neutron Imaging and Tomography in Cultural Heritage Research” was initiated and Thailand was chosen to participate in the project. In order to preserve the original characters of cultural heritage for our future generations, it is significant to perform all investigations on object non-destructively. Neutron radiography serves to meet the requirement. Neutron radiography of several objects has been taken at TRR-1/M1 using conventional film method and reusable imaging plate. Even the facility has been operated for more than a decade; the current status is still under developing. Several difficulties as a result of limited facilities including lack of neutron camera and its components lead to 3D neutron imaging are likely impossible to achieve. In the early state, a DSLR camera assembled with an in-house light-tight-box and a prototype computer controlled rotary table were set up for Buddha sculpture analysis. Subsequently, the first near real-time digital neutron imaging was established in Thailand in 2012. Furthermore, the combination image of neutron and X-ray provides complete inner structure information that helps better understand the past manufacturing technology as well as to obtain an appropriate conservation method. The authentication proofs and relative dating using structural profile along with elemental analysis by NAA and XRF will be studied further to implement the cultural heritage interpretation. In order to achieve 3D imaging capability, the current neutron radiography facility is scheduled for upgrading in various aspects including exposure station, shielding wall, and beam shutter. In parallel to the upgrade of the hardware, image reconstruction techniques and software are currently investigated and optimized to fulfill the information that is difficult to achieve by 2D imaging. The upgraded facility (hardware and software) will not only contribute to research and advanced application of neutron imaging techniques in Thailand, but will also contribute to human resource development in the area of neutron imaging technology in this region. In addition, the renovated facility will be further possible to establish routine approaches for archaeological service and wide range of applications.

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**Session Classification:** Poster Session

**Track Classification:** NINMACH