



Contribution ID: 22

Type: Talk

Detectors for neutron imaging

Wednesday 30 August 2017 11:00 (45 minutes)

Manuel Morgano (1) & Burkhard Schillinger (2)

1) Paul-Scherrer-Institute, Villingen, Switzerland

2) Burkhard Schillinger, Heinz Maier-Leibnitz Zentrum, Technical University of Munich, Germany

Email: manuel.morgano@psi.ch

Neutron imaging has proven itself as an invaluable non-destructive investigation technique in many fields of science and engineering. To make the best use out of every neutron, however, one must not forget the often overlooked problem of detecting the neutrons to begin with. In this lesson we will take a step towards understanding the physics and the technology of neutron detections, with a special focus on neutron imaging. We will start with an overview as to why the same reasons for which neutrons are invaluable probing tools, also means that they are not as straightforwardly detected as other types of radiation.

The main part of the lesson will be devoted to the physics of (neutron) scintillators and to the description of the workhorse of neutron imaging detector, the combination of scintillator screen and camera. Two main types of camera will be described, CCD and sCMOS camera, highlighting the pros and cons of the two technologies and listing their respective application fields. From the scintillator side, we will present the differences between ^6Li -based scintillators and Gd-based scintillator and their respective strengths and weakness.

Finally, an outlook of more modern types of detectors will be given, in particular about those detectors that can benefit from present and upcoming modern pulsed neutron sources. These detectors allow the discrimination of the time of arrival of the neutron with high precision, on top on the localization of the neutron event itself. This new kind of detectors really adds one dimension to the neutron imaging detectors landscape, unlocking the access to more information and more science.

Author: Dr MORGANO, Manuel (Paul Scherrer Institut)

Presenter: Dr MORGANO, Manuel (Paul Scherrer Institut)

Session Classification: Wednesday