Building Future Safeguards Capabilities
SYMPOSIUM
ON INTERNATIONAL SAFEGUARDS

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Muon imaging for safeguards applications

Because of the very high penetrating power of the high energy muon, muon imaging can be used to image large and dense objects where other techniques such as the x-ray imaging often fail. Another advantage of this technique is that it can use naturally occurring cosmic-ray muons as the probe to do muon imaging. There are several ways muons may interact with matter which can be used for imaging, these include: multiple scattering, energy loss and production of secondary particles, and the beam intensity loss (absorption). Due to the technical difficulty for measuring the muon momentum, it is not easy to use the energy loss of each individual muon to reconstruct an image. Muon multiple scattering imaging and the muon absorption imaging are the most popular techniques, where muon multiple scattering imaging can be used to deal with relatively small objects such as shipping containers while the muon absorption imaging is better suited for larger objects such as volcanos. Both the muon multiple scattering and absorption imaging systems need muon tracking detectors. If additional detectors such as neutron detectors are used to detect the secondary particles caused by muons, tomography images can be formed by using these tagged muon tracks. In this paper, the capabilities of different muon imaging techniques are reviewed and new combined imaging techniques proposed with an aim for the safeguards applications.

Which "Key Question" does your Abstract address?

NEW1.2

Topics

NEW1

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