



Contribution ID: 332

Type: oral

Neutron Multiplicity Counting for Future Verification Missions: Bias When the Sample Configuration Remains Unknown

Thursday 23 October 2014 16:00 (20 minutes)

Passive neutron multiplicity counting to determine plutonium mass is used nowadays inter alia in Safeguards applications. As opposed to total neutron rate counting, it can determine plutonium mass also in oxides and samples with induced fission processes if the isotopic composition is known. Neutron multiplicity counting may be helpful for other missions. These may include CBRN response related to nuclear trafficking, and verification of nuclear material, including the nuclear fuel cycle and military stocks under potential future regimes. Sometimes, the exact sample configuration may remain unknown.

Despite the technique's clear advantages, limitations require further study. Besides the influence of possible shielding between sample and detector, the assay results are dependent on the configuration, in particular geometry, of the fissile material. Assay bias for highly multiplicative samples has already been studied to some extent which lead to the introduction of corrections to the point model which is usually used to calculate the fissile mass. This paper presents MCNPX PoliMi simulation results of different plutonium sample and shielding configurations to critically evaluate eventual bias occurring with the point model. In addition, correction methods will be evaluated.

Country or International Organization

Germany

Primary author: GÖTTSCHE, Malte (Centre for Science and Peace Research - University of Hamburg)

Co-author: KIRCHNER, Gerald (Centre for Science and Peace Research - University of Hamburg)

Presenter: GÖTTSCHE, Malte (Centre for Science and Peace Research - University of Hamburg)

Session Classification: NDA Measurements II: Gamma and Neutron