Title: Reducing the uncertainties in modelling results through better understanding of the impact of physical uncertainties

Nicolas MARY, Cédric DOSSAT, Ludovic EYCHENNE, Nathalie CHATRY

TRAD Tests & Radiations, Labège, 31670, France

Abstract

In the field of radiation processing, modelling is an asset. It can be used to investigate different loadout, assess the viability of a process, determine whether a double-sided irradiation will be necessary… To that end, understanding where the uncertainties stem from is a critical aspect, both with measurement and with simulated results. With regard to radiation processing, both the lowest dose and the highest dose received by the target are of importance, meaning that penalizing hypothesis cannot be used so as not to skew the results toward either high or low results. Nonetheless, for practicality reasons, hypothesis often need to be used regarding parameters such as chemical composition, thickness of radiation shielding, sources' activity, distance between source and targets, etc. Using the RayXpert® 3D Monte-Carlo code, we aim at evaluating the impact of standard uncertainty on the dose (water kerma) on a typical Co-60 irradiator. Uncertainties regarding the source activity, distance between target and source and thickness of parts of the packaging will be investigated.