

# FINAL BOOK of ABSTRACTS

## MARC XII

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**Log 513. ENERGY DEPENDENCE OF FISSION PRODUCT YIELDS FROM THE MAJOR ACTINIDES**

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A joint collaboration between LANL-LLNL-TUNL has produced a large set of absolute differential cumulative fission product yields for the major actinides. This data has shown new energy dependence to a number of peak yield fission products. Measurements have been made in nearly 1 MeV steps from 0.5 – 14 MeV using quasi-monoenergetic neutrons from the Triangle Universities Nuclear Laboratory (TUNL) Tandem accelerator. This new energy dependent fission yield data is highly useful to reactor design, nuclear forensics, and the forth coming new fission data evaluation. Data will be presented on dozens fission product yields, whose half-lives vary from minutes to months and were measured using fission chambers, for absolute fission number of fissions, and off-line gamma-ray spectroscopy. We will also discuss current efforts on very short-lived fission products using a rapid transfer system and cyclic activation where we are measuring fission yields who half-lives are on the order of seconds.

**Log 514. RADIONUCLIDES FOR THERANOSTICS APPLICATIONS: Mn-52 PRODUCTION BY DEUTERON BEAMS IRRADIATION**

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Now a day the new frontier of Nuclear Medicine (NM) is the use of artificial radionuclides that present nuclear properties suitable for theranostic applications that combine therapy and diagnosis in the same radiopharmaceutical to go in the direction of personalized medicine. This term is applied also to nuclides with properties that can give complementary diagnostic information. A promizing nuclide that presents these characteristics is manganese. In particular manganese-52 is a radionuclide which decays with positron emission and electron capture, with a medium-long half-life ( $T_{1/2} = 5.591$  d). with possible and promising use in NM as a radiotracer for PET diagnostic tests; the low energy of the positrons emitted (244.6 keV) and the short range in the tissues (0.63 mm) would allow to acquire diagnostic images of a quality similar to those obtained with radiotracers already in use, such as fluorine-18 (252 keV; 0.66 mm). Moreover, the stable isotope of manganese  $Mn^{2+}$  presents paramagnetic properties that make it suitable for use in MRI, opening the possibility of obtaining multi-modal PET / MEMRI images. Currently manganese is produced by irradiation with protons on chromium targets. We have studied the production of Mn-52 using  $natCr(d,x)$  nuclear reaction by deuteron beams irradiation, that could be more advantageous. New sets of excitation functions for this nuclear reaction and the co-produced contaminants were obtained and compared with the other sets present in literature and the results of simulation with EMPIRE 3.2.2 and TALYS codes.

