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Standardization of ^{18}F using new portable $4\pi\beta(LS)-\gamma$ coincidence detection system at ENEA-INMRI

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This project concerned on the development at ENEA-INMRI of new in-situ $4\pi\beta(LS) - \gamma$ coincidence detection system for activity measurement of the short half-lived radionuclides used in Nuclear Medicine. The hardware of the new portable $4\pi\beta(LS) - \gamma$ coincidence detection system was implemented at ENEA-INMRI, in collaboration with Catania University and INFN, by adding a gamma channel on the existing TDCR portable detector available at ENEA-INMRI. A new data analysis software was developed at CAEN, independently from an existing one elaborated at ENEA-INMRI, in order to analyze the data recorded in list-mode by the new detector equipped with the CAEN desktop digitizer DT5720. The activity for short half-life radionuclides used in nuclear medicine can be then computed. Two primary activity measurement - TDCR and $4\pi\beta(LS) - \gamma$ coincidence - methods were then used to determine the activity of ¹⁸F at ENEA-INMRI. The TDCR parameter is measured for ¹⁸F standard solution using both CAEN and ENEA-INMRI data analysis software.

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