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Total Absorption Spectroscopy of isotopes with medical interest at ISOLDE

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The therapeutic and diagnostic use of radionuclides is well known and widely applied in different techniques and pathologies. The efficacy of the treatments, as well as the off-target dose minimisation in both treatment and diagnosis depend, among other things, on the decay characteristics of the radionuclide in use. In particular, the different particles and radiation emitted, the emission energies and the emission probabilities, are of paramount importance in the calculations of the dose administered to the patient in medical imaging or therapeutic treatment with radioisotopes.

In this contribution we will present a series of TAS measurements carried out at ISOLDE (CERN) since July-2022 aimed at the detection of all the beta strength missing in previous studies of some nuclei of medical interest. The advantage of the TAS technique over the high-resolution one, lies in the high sensitivity of the former, since it allows the measurement of weak beta decay branches to levels at high excitation energy in the daughter nucleus, where HPGe-detector arrays tend to have lower sensitivity.

Our results on the beta-intensity distribution within the Q window of the selected isotopes will be useful to calculate the distribution of energy per decay that goes as gamma rays or as kinetic energy of emitted particles, and therefore to calculate the dose administered to a patient subject to a PET scan or theranostic treatment. We will show results on ^{66}Ga and comparisons of recent TAS data vs evaluated ENSDF data on $^{128}\text{Ba}/^{128}\text{Cs}$, ^{76}Br and ^{152}Tb .

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