

Fluka Simulations on ^{18}F Production by Proton-Induced Reaction

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Abstract. Isotope labeled molecules are widely used in medical imaging that provides insights into various mechanisms of human physiology. ^{18}F is one of the most often used PET radioisotopes and it is produced mainly on cyclotrons. Institute for Nuclear Research and Nuclear Energy has a cyclotron capable to deliver proton beams with parameters exceeding the ones needed for ^{18}F .

The primary goal for the current R&D program on radiopharmaceuticals in INRNE is the production of ^{18}F . Utilizing Monte-Carlo simulations, a well known approach towards the optimization of the production yield of the radioisotope and the shielding performance of the building housing the cyclotron facility, and a commercially available target prototype, a numerical model was build and simulated using the FLUKA package.

The thick target yield using the reaction $^{18}\text{O}(p,n)^{18}\text{F}$ on $[^{18}\text{O}]\text{H}_2\text{O}$ for different irradiation conditions in terms of beam energy and current are shown. The results agree well with published experimental data.

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