



Contribution ID: 198

Type: Poster

Preliminary considerations for production of radioisotopes by photonuclear reaction using ELI-NP γ -ray beam

Thursday, 3 September 2015 16:30 (1h 30m)

A very brilliant, intense γ -beam, which is produced by incoherent Compton back-scattering of direct laser light with a very brilliant and intense electron beam, will become available at the upcoming Extreme Light Infrastructure - Nuclear Physics facility (ELI-NP). Such facility will deliver a very intense, brilliant γ -rays, $\leq 0.5\%$ bandwidth, up to 19 MeV and hence provides an unprecedented possibility for the production of radioisotopes in sufficient quantities for nuclear medicine research. We present the isotope production photonuclear reaction schemes and cross-section simulations under realistic conditions. We have to deal with reaction cross-sections as low as 0.1 barn for (γ, n) . We discuss the production of a key medical radionuclide, $^{99}\text{Mo}/^{99\text{m}}\text{Tc}$, and particularly focus on the investigation of new radioisotopes including ^{186}Re , ^{64}Cu and $^{225}\text{Ra}/^{225}\text{Ac}$ for nuclear medicine applications. The optimal conditions for generating medical radioisotopes with high specific activities are found, and estimate to be produced in sufficient quantities for such research. This simulations will be used in target design and also for radiochemical processing experiments with the view for the potential clinical applications of radioisotopes.

Primary author: NICULAE, Dana (Horia Hulubei National Institute for Physics and Nuclear Engineering, Magurele, Romania)

Co-authors: Dr FILIPESCU, Dan Mihai (Horia Hulubei National Institute for Physics and Nuclear Engineering, Extreme Light Infrastructure - Nuclear Physics (ELI-NP), Magurele, Romania); BALABANSKI, Dimiter (Horia Hulubei National Institute for Physics and Nuclear Engineering, Extreme Light Infrastructure - Nuclear Physics (ELI-NP), Magurele, Romania); Ms GHEORGHE, Ioana (Horia Hulubei National Institute for Physics and Nuclear Engineering, Extreme Light Infrastructure - Nuclear Physics (ELI-NP), Magurele, Romania); Dr LUO, Wen (Horia Hulubei National Institute for Physics and Nuclear Engineering, Extreme Light Infrastructure - Nuclear Physics (ELI-NP), Magurele, Romania)

Presenters: NICULAE, Dana (Horia Hulubei National Institute for Physics and Nuclear Engineering, Magurele, Romania); BALABANSKI, Dimiter (Horia Hulubei National Institute for Physics and Nuclear Engineering, Extreme Light Infrastructure - Nuclear Physics (ELI-NP), Magurele, Romania)

Session Classification: Poster