

DNP20-2020-000964

Abstract for an Invited Paper
for the DNP20 Meeting of
the American Physical Society

The Development of PET Generator Systems at the Brookhaven Linac Isotope Producer.

VANESSA SANDERS, Brookhaven National Laboratory

The Medical Isotope Research and Production (MIRP) team utilizes the 66-220 MeV incident beam Brookhaven Linac Isotope Producer (BLIP) to produce novel and routinely used medical isotopes. This high-energy particle accelerator is only one of a few facilities in the country that can produce such a wide range of isotopes. The unique energies and high current enable us to produce diagnostic and therapeutic isotopes of interest for noninvasive detection and treatment of disease. At BNL we are interested in the high-energy proton production of positron emitters for use in Positron Emission Tomography (PET) diagnostic applications. One isotope of interest is arsenic-72 (^{72}As), a potential radionuclide for antibody-based PET due to its excellent physical properties. These optimal characteristics include an appropriate half-life of 26 hours, which matches well with the biological half-life of monoclonal antibodies. Another PET isotope of interest is scandium-44 (^{44}Sc , $t_{1/2} = 3.9$ h), a shorter-lived radionuclide that matches well with the biological half-life of small biomolecules and has high potential of aiding in therapeutic response. Both radionuclides are also promising due to their increased availabilities through the use of generator systems. Within these systems the long-lived parent is loaded onto a solid support which can be transported and the isotope of interest (^{72}As , ^{44}Sc) is eluted. Here, we discuss the developments we have made in the production of ^{72}As , and ^{44}Sc .