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## Personalised production of medical radioisotopes with laser-accelerated protons

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Many diagnostic methods are based on the use of tracers labelled with radioactive isotopes. Their production in centralised facilities and delivery to local health centres imply strong constraints to the isotope half lives. For this reason, more than 90% of all PET interventions are based on F-18 at present. The on-site synthesis of short-lived tracers containing C-11, O-15, or N-13 would allow for a wealth of drugs with ideal characteristics for each patient and pathology.

The production of radioisotopes requires beams of accelerated protons or deuterons with energies around 15-20 MeV/u. A novel acceleration technique based on highly intense, pulsed lasers has the potential to provide such beams at much lower cost than classical synchrotrons. We present the development of a dedicated setup aiming at the production of PET isotopes, comprising a table-top, terawatt laser with high repetition rate. With this setup we have recently achieved the first demonstration of laser-proton acceleration in Spain. In addition, we have calculated the requirements for the synthesis of useful quantities of different isotopes in various reaction channels.

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