

# LINEAR PROTON ACCELERATOR FOR CANCER THERAPY

**Innovations and benefits** - The use of proton therapy is ever fast increasing and offers a more accurate radiation treatment than gamma-ray therapy, preventing healthy organs surrounding the treated area from being affected. The IMPLART system is a more compact and versatile facility compared to the circular accelerators already on the market, besides having lower maintenance and shielding costs so that it can be widely used and easily commercialized.

**Uses** - Pulsed proton radiation therapy for cancer treatment. Possible highly-conformal radiation therapy through adjustment of the cross-distribution with a scanning system, by rapidly modulating energy and varying the current intensity depending on the pulse type.

**Past and present activities** - The development of the TOP-IMPLART device is underway for Regione Lazio; it is designed and developed by ENEA, in collaboration with the National Institute of Health (ISS) and the IFO-IRE hospital in Rome as to dosimeter and pre-clinical tests. Actually it delivers a 35 MeV beam. After reaching a beam energy between 65 and 150 MeV and the necessary validation tests, it will be hosted in a hospital in Rome. In the past years consulting was given to children projects in Italy (Apulia) and abroad (Switzerland). Studies are underway to assess possible specific treatment for childhood tumors, radio-resistant cancers, parallel radiation protection (IRP) and clinic dosimetry, with the development of imaging radiation detectors, and preclinical radiobiology studies for the optimization of therapeutic protocols, in collaboration with the Territorial and Production Systems Sustainability Department (SSPT).

