

Development of a radiation protection hybrid training plan for the staff of the new proton therapy facilities



G.F. García-Fernández¹, J. Castro², D.A. Mazal², E. Gallego¹

¹ Universidad Politécnica de Madrid (UPM), ETSII, Energy Engineering Department (Nuclear Area), Madrid, Spain

² Quironsalud Proton Therapy Center, Pozuelo de Alarcón (Madrid), Spain

Centro de Protonterapia
Grupo Quironsalud

*Corresponding author: gf.garcia@upm.es

POLITÉCNICA



The eleven new public proton therapy centers (PTC) under construction in Spain

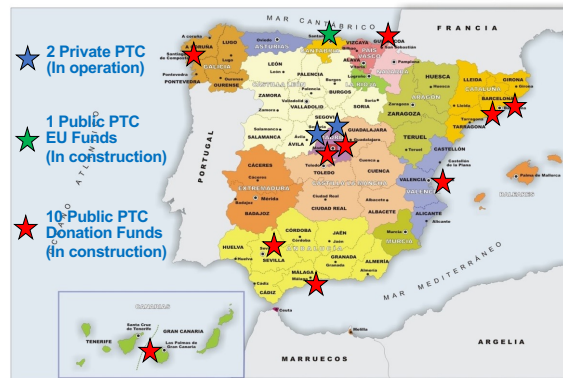
MOTIVACIÓN

Proton therapy, radiotherapy with accelerated-protons, has growing potential in dealing with some tumors, and consequently, in the last decade proton therapy centers (PTC) are growing across the world, with a forecast that will double by next five years.

Despite its more than sixty years of existence, the advent to Spain was very recent, with a first PTC operating from December 2019, and the second in April 2020 (blue stars). A third centre, the first of Public Health System, is under construction in Santander (green star).

In August 2022, was announced the building of ten new proton therapy rooms for the Public Health System (red stars), thanks to a donation of 280 million euros from the Amancio Ortega Foundation [1]

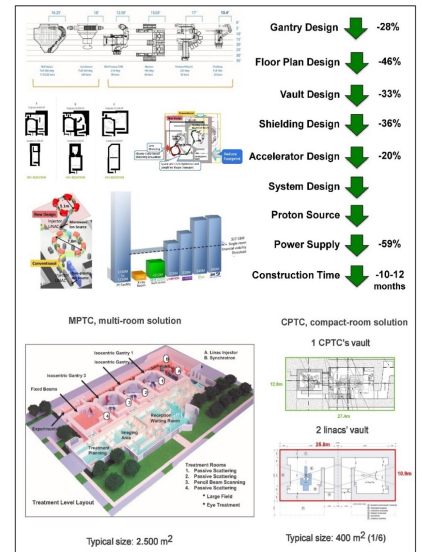
THE ADVENT OF PROTON THERAPY TO SPAIN



PURPOSE

The main objective of this project is to develop a training plan in operational radiation protection focused on staff and work teams of PTC.

COMPACT PROTON THERAPY CENTERS (CPTC) AND RADIOPROTECTION



Compact Proton Therapy Centers (CPTC) [2]
 • Reducing cost and footprint
 • Increasing radioprotection challenges

Training plan in operational radiation protection for staff of new proton therapy centers

PLANIFICATION AND TOPICS

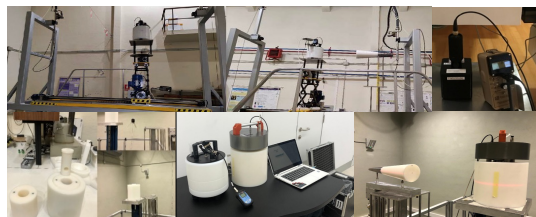
Planification and methodology

1. Basic theory and practical training.
2. Hybrid training, in-person and online. Asynchronous lessons and learning platform.
3. 60 learning hours in two weeks.
4. Training based on competencies rather than qualifications.
5. Training plan will be certified within the national health system.

Main topics on radioprotection in PTC

1. Technology in PTC.
2. Physics foundation of proton therapy.
3. Sources of radiation in PTC.
4. Basic in shielding
5. Ambient detection.
6. Personal dosimeters.
7. Activation of shielding, mechanical elements and ambient.
8. Operational radiation protection.
9. Legal requirements.
10. Challenges on new delivery modes, future developments, and CPTC.

FACILITIES FOR PRACTICAL TRAINING



Laboratory of Nuclear Technology (UPM-LNT) for training fundamentals in radiation protection



Proton therapy centers for training operational radiation protection in situ

REFERENCES

- [1] García-Fernández, G.F. et al. Benchmarking of stray neutron fields produced by synchrotrons and synchrotrons in Compact Proton Therapy Centers (CPTC) using MCNP6 Monte Carlo code. App. Rad. Isot. (2023) Vol 193: 110645.
- [2] García-Fernández G.F. et al. Neutron dosimetry and shielding verification in commissioning of Compact Proton Therapy Centers (CPTC) using MCNP6.2 Monte Carlo code. App. Rad. Isot. (2021) Vol 169 : 109279.

EXPECTED RESULTS

1. The scenario foreseen, both in Spain and worldwide, highlights the need to train professionals in radiological protection in proton therapy facilities.
2. The training plan proposed will be developed in a hybrid way, with activities followed remotely, others carried out in person at the laboratory, and finally, in a third stage, activities *in situ* inside a real PTC.
3. The training plan will be developed at national and international level.

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