

ROSSI-1: The BNCT at the Italian National Center for Oncological Hadrontherapy (CNAO)

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Some elementary particles used for experiments of fundamental physics have properties useful to the treatments of patients affected by oncological pathologies. They are protons and carbon ions, collectively named hadrons hence the term hadrontherapy. Hadrons, in particular carbon ions, are more precise on the target than conventional X-rays and possess radiobiological characteristics suited to treat radioresistant or inoperable tumours. Italy is at the forefront of these techniques and in Pavia a clinical facility called CNAO (Italian acronym that stands for National Centre for Oncological Hadrontherapy) has treated so far 3000 patients with very good results. The CNAO has been created by the Italian Health Ministry and has been realised by CNAO Foundation in collaboration with many institutions in Italy and abroad.

Besides the use of hadrons to treat localised tumours, is presently in discussion the expansion project for a BNCT centre. The Boron Neutron Capture Therapy would open the possibility to treat disseminated malignancies and pathologies not presently cured, thus representing a complementary application to hadrontherapy. CNAO, in addition to its clinical record with hadrons, would profit of the experience matured at the University of Pavia, that pioneered the clinical treatments of ex-situ liver patients in collaboration with the nearby San Matteo hospital, of the collaboration with INFN and other institutions to introduce BNCT into the clinical practice. The integrated centre of experimental radiotherapies at CNAO would be a unique site to perform pre-clinical and clinical research in the field of radiation applied to medicine, including protons, carbon ions and BNCT.

The talk will deal with the rationale of hadrontherapy and will give an overview of the status of hadrontherapy in the world. The characteristics of the accelerators and systems involved in the clinical applications will be introduced and the treatments results illustrated. The project BNCT@CNAO and the Institutions involved will be outlined. Attention will be devoted to the most interesting aspects of research and development.