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## INFN super cyclotron that helps treat tumors

*Inaugurated the headquarters of Legnaro the machinery that produces and accelerates protons: "Primacy of EU power, will be applied in radiotherapy"*

**Silvia Quaranta**

HEALTH RADIO THERAPY CYCLOTRON SEARCH

December 2, 2016



PADUA. The National Institute of Nuclear Physics (INFN) Legnaro become a benchmark in Europe and throughout the world. Yesterday was finally ushered in the cyclotron P70, the heart of the "Spes": a word which in this case is an acronym, but in Latin means "hope". The powerful machinery will help to improve cancer treatment and studying the universe, especially the stars.

The process that led to the creation of the cyclotron was long: in 2010, at the time of the first inspection, instead of the current structure was a grove.

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Shortly after he left the design phase, fundraising and then construction of the project: the first stone was laid in 2013 and a year and a half ago, in the spring of 2015, the machine has been lowered from inside the building still under construction. The machine weighs 180 tonnes and is capable of producing and accelerating protons at the rate of ten million billion every second.

Numbers that, perhaps, for non-experts say little, but certainly return the power measurement, "The cyclotron" says Fernando Ferroni, president of the INFN, "is a machine that accelerates protons: there are others of similar, but this differs by the very high energy and for the high number of protons that can produce. Characteristics that make it currently only, certainly in Europe and perhaps throughout the world: there are in course of designing similar machines, but our leaders accelerator will remain for a long time. Our research looks ahead: not a few months, but for twenty years. "

From the cyclotron will be two beams of protons extracts: one dedicated to nuclear astrophysics studies, the other applications, in particular those directed to medicine, but also to the study of the properties of the new materials, by means of the irradiation with neutrons.

"In the medical field," explains Giovanni Fiorentini, director of Legnaro laboratories, "the applications relate mainly to radiotherapy. Currently, to detect and treat certain cancers, using isotopes that do not exist in the human body and are injected with drugs. They point to feature in the body the presence of lesions and treat them. Today is used common isotopes, but one day we can also play those rare, which allow better investigation. There are isotopes which have "teranostiche" quality, that is useful both for the knowledge - Diagnostics - both for therapy. You can make a instant monitoring of where you locate the isotope and hit the cells that are to be affected. "

But also with regard to the universe opens up new prospects and no less striking: "This is a factory of radioactive nuclei" Fiorentini continues, "that we are not on the ground but that we find in the advanced stages of the stars. Studying them, we can understand how they form the heavier and rare earth elements, such as gold, lead or thorium.

Another possible use is to produce neutron beams, useful in spacecraft, because they simulate the radiation that astronauts will face that will explore Mars". Among the innovative aspects of the project, the INFN also signals the financing system. For the Spes operation will use the funds derived from the production of radioisotopes for medical use, an aspect that guarantees a perspective of autonomy and continuity of the project.

 **HEALTH RADIO THERAPY CYCLOTRON SEARCH**

December 2, 2016



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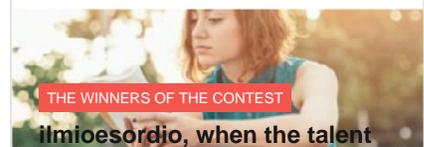


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