

INAUGURATED LABORATORIES INFN LEGNARO

Il nuovo acceleratore di protoni INFN Legnaro

Author: Editorial Staff Media Inaf

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It is called SPES, an acronym for the selective production of "exotic species" but it has nothing to do with Darwin. This is the most powerful accelerator of protons existing in Italy and it allows both the study of unstable atomic nuclei, such as those formed in the core of the stars, as well as production of medical radioisotopes





We will study the **Uca JWbi WY** produced in the late stages of the evolution of stars and, at the same time, will produce **fUXjcJgcIcdYg'Zf'a YXJWbY**. This is the dual objective of the project **SPES** (*Selective Production of Exotic Species*), whose **cyclotron**, and the **dUfhWY'UWY'YfUcf** that is at its heart, was inaugurated on December 2 at the **National Laboratory of Legnaro** (LNL) of the National Institute of Nuclear Physics (INFN).

"For the SPES aspect, the most intriguing part of nuclear physics is the ability to produce highly unstable nuclei, very different from those that we find on Earth," says **Giovanni Fiorentini**, director of LNL. "Most of our knowledge about the properties of nuclei was acquired through the study of existing stable nuclei: the SPES beams open a new perspective that will provide knowledge about the properties of nuclei in extreme conditions."

The heart of the SPES project is represented by high intensity cyclotron, a circular accelerator able to produce protons and accelerate at the rate of **Hyb'a J''cb'VJ''cb'dfclcbg'Yj YfmigYWtbX**. From the Cyclotron **hk c'dfclcb'VYUa g** will be extracted: one dedicated to the studies of **bi WYUf' Ughfcd\ ngjWj**, and the other applications, in particular those directed to medicine, but also to the study of the properties of **bYk 'a UYf]Ug**, by means of the irradiation with neutrons.



Fernando Ferroni, president of INFN, cuts the SPES ribbon

"SPES is the flagship accelerator for nuclear physics that INFN offers to Italian researchers and those who wish to use it coming from other countries due to its competitiveness," adds the president of INFN **Fernando Ferroni**. "Its purpose is still beyond that of basic research, because this accelerator will be also used for the production of particular **fUX]cbi W]XYg** for nuclear medicine, which will be useful for the **X]U[bcg]g'UbX'fYUa YbhcZ\ YUfhX]gYUgYg' UbX'cbWt`c[m**"

Among the innovative aspects of the project – a total value of around 50 million Euro, of which a dozen for only synchrotron – is also highlighted the funding system. For the SPES operation, it will be crucial that the funds will be derived from production of radioisotopes for medical use, an aspect which guarantees the project a prospect of autonomy and continuity.

SPES is part of the larger European project **Eurisol**, which today sees the European nuclear physicists engaged in the construction of three infrastructure of radioactive ion beams. In addition to SPES, under construction in France is a machine with similar characteristics, **SPIRAL2**, and CERN is in the process upgrading the existing equipment **ISOLDE**. These three machines will form a distributed infrastructure in Europe.

K UW`h Yj]XYc`gYfj]W`B5 : !HJ.

<https://youtu.be/ii3hU2erKrE>

7\ YW`ci h]h Yj]XYc`cb`h Y`B: B`BU]cbU` @VcfUcf]Yg`cZ@[bUfc.

https://www.youtube.com/watch?v=qgL-Cb_jgPw