



## Accelerators at INFN-LNS *S. Gammino*

A significant upgrade of LNS has been funded in 2019 by a PON-FESR strategic line for boosting research infrastructures, having its own goals, time-schedule and deadlines. In addition to such action promoted by the Italian Ministry of Research, some funds have been made available by INFN budget in order to replace or improve ancillary equipments of the LNS Accelerators. The end of the phase supported by the PON, aiming at procurement and tenders, is currently set by December 2022, but the Start of User Programme (SOUP) cannot be set before spring 2023 for the Tandem and 3<sup>rd</sup> quarter 2023 for the Superconducting Cyclotron (CS) which revamping is the major focus of the PON-FESR funding.

The project scientific goal is to increase the CS beam luminosity by two order of magnitude, in order to carry out new experiments investigating rare phenomena (e.g.: NUMEN, dealing with neutrinoless double beta decay nuclear elements matrix and all the activities related to FRAISE, the new fragment separator for the production of radioactive beams by fragmentation). To increase the beam luminosity the Superconductive main magnet and the liner of the CS, the beamlines, the shielding, the power supply and cooling plant of the LNS shall be rebuilt.

Some improvements will be completed before SOUP date also for the Tandem, including an upgrade of the injectors' to make noble elements available and an update of the controls and electronics.

In 2021 another important funding was secured to permit the purchase and installation of a 100 TW laser that will permit to investigate on nuclear cross sections studies in laser plasmas and on new acceleration schemes of electrons and protons with particular emphasis on the medical applications.

Finally the scope of accelerator R&D activities will be reported, in particular the design of DLA components, the tests of the AISHa sources, the improvement of plasma diagnostics tools and of beam management tools.

