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SPES: An intense source of radioactive beams at Legnaro

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The SPES project at the Laboratori di Legnaro of INFN (Italy), currently in the construction phase, consists of a new cyclotron accelerator delivering high intensity, up to 70 MeV proton beams. The beam impinges on an ISOL target for the production of a variety of radioactive nuclei for nuclear physics experiment.

Its target-ion source complex represents the core of an ISOL facility. In particular, the choice of the target material is vital to ensure excellent performances in terms of quantity and regularity of the isotopic yields over the duration of beam delivery.

The main target material for nuclear physics applications will be fissile. Such configuration will provide intense neutron-rich radioactive ion beams obtained by proton-induced fission of a uranium carbide (UCx). Besides this, silicon carbide (SiC) will be used to deliver p-rich beams.

The exotic isotopes generated in the target are ionized, mass separated and initially delivered to a beam line dedicated to experimental measurements at low energy.

The status of the project and the radioactive ion beams that will be delivered after the facility commissioning will be presented.

The aim is to trigger a discussion on the potential exploitation of the SPES facility and of decay and hyperfine interaction techniques to gain microscopic information on the structural and dynamic properties of new materials, thin films and interfaces in nuclear technology and nanoscience.

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