PRESS RELEASE

A customised test bench to further research actions in the area of nuclear fusion

- *A multidisciplinary team at Tekniker uses a prototype to simulate the critical components of the particle accelerator developed under the umbrella of the international IFMIF-DONES project.*
- *This equipment, designed and manufactured by the technology centre jointly with the University of Granada and the IFMIF-DONES Spain consortium, will make it possible to perform highly accurate experiments and acquire valuable information required to validate the design of IFMIF-DONES.*
- *The scientific facilities of IFMIF-DONES are currently under construction in the municipality of Escúzar (Granada) and form part of an ambitious programme deployed by the EU to develop fusion as a source of energy.*

[Eibar, 23 february 2023] –Nuclear fusion consists in replicating the Sun's atomic processes and reactions on Earth to obtain cleaner energy. Particle accelerators are the main technical tools used to investigate new materials required to manufacture fusion reactors.

It is in this context that a multidisciplinary team at the **Tekniker** technology centre is working to develop an innovative test bench to further energy research actions in the area of nuclear fusion.

Thanks to this experimental prototype, it will be possible to perform all the tests required to check the reliability of the critical elements of **IFMIF-DONES,** the innovative particle accelerator to be commissioned in the municipality of Escúzar (Granada).

More specifically, the equipment developed by Tekniker will allow IFMIF-DONES scientists to learn more about the behaviour of different mechanical systems, components and materials used on the particle accelerator's line to deal with unexpected events.

The technology centre will cover all the phases of this project from design, manufacture and assemblage of the prototype to final installation work at the University of Granada with the support of **AVS** and **TVP**, two companies that will supply a number of critical components.

The technology centre will not only contribute its expertise in the domain of Ultra High Vacuum (UHV) equipment but also make available its technological capabilities related to areas such as metrology, mechatronics, surface engineering, automation and control.

As the entire system will be fully mounted by April at Tekniker's facilities, it will not only be possible to ascertain that all components operate correctly but also obtain data instantaneously thanks to a fully automated system.

In this regard, the system has been fitted with an ad hoc network of sensors to achieve full operational speed and extensive synchronisation to meet the needs and requirements arising from the highly advanced experiments to be carried out on this installation.

Andoni Delgado, the person in charge of the Science Industry unit at Tekniker explains that "the network of sensors we have to configure for the prototype should be able to capture and analyse how the wave front advances when it can reach speeds in excess of 500m/sec".

A team made up of Tekniker researchers will assemble the equipment in the technology centre's ultra-precision room, a sizeable space that meets all requirements with regard to humidity, temperature and cleanliness so that operations can be carried out with Ultra High Vacuum systems.

A unique project in the world

The prototype will recreate the last 30 metres of a line that connects the accelerator's high energy beam with the lithium white chamber to perform an experimental study on the duration of wave front propagation and validate the protection systems designed to mitigate unexpected events.

The person responsible for the Science Industry unit also states that "although there are some tests performed like those that we want to reproduce, there is currently no specific in situ installation capable of replicating all of these testing campaigns that this option will provide. Consequently, the repercussion of the results obtained will be a matter of great interest for the scientific community dedicated to developing particle accelerators. The

knowledge acquired will also be useful in the industrial sector in areas such the manufacture of critical components and advanced sensorics."

The prototype, called MUVACAS (Multipurpose Vacuum Accident Scenarios), will make it possible to adapt the design and the optimum configuration of the particle accelerator to be built within the framework of the international IFMIF-DONES initiative (International Fusion Materials Irradiation Facility – Demo Oriented NEutron Source).

The Tekniker researcher also believes that "IFMIF-DONES is a unique installation in the world that will eventually become a strategic scientific infrastructure for scientists working in the area of energy research & innovation".

This installation, currently under construction in Granada, forms part of an ambitious EU programme aimed at developing fusion as a source of energy. It has been estimated that a budget of 700 million euros will be required to build and commission the facilities.

More about Tekniker

Tekniker is a technology centre that specialises in advanced manufacturing, materials and surface engineering and ICTs for production. Its mission is to further growth and wellbeing for society at large via R&D&i by enhancing the competitiveness of its industrial fabric in a sustainable manner. Tekniker is a member of the Basque Research and Technology Alliance (BRTA).

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