

**ESS**  
bilbao

# newsletter

JUNE 2022



Courtesy of ESS



4

# summary



6



**10**

**IMOH2022, FIRST INTERNATIONAL MEETING ON THE CHALLENGES AND OPPORTUNITIES OF COMPACT NEUTRON SOURCES**



**12**

**MAKING PROGRESS AT MIRACLES INSTRUMENT**

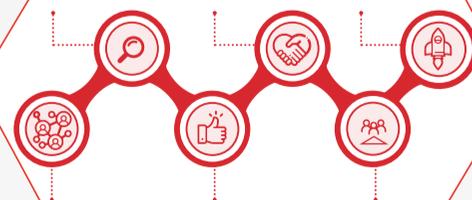
**14**

**WHAT'S GOING ON AT ESS BILBAO**

**14**

**16**

**OUR VALUES KEEP US GROWING FOR THE FUTURE**





MARIO PÉREZ  
Executive Director

## *The Reward of effort*

**T**his first half of the year 2022 marked a key milestone to ESS Bilbao and the European Spallation Source with the completion of the Target System, including the delivery of the Monolith Vessel, Target Wheel, Drive Unit and Shaft.

*We are delighted to share with you this success and the reward after years of efforts and commitment towards the delivery of this key system.*

*We interviewed Alex Conde, our MIRACLES Lead Engineer, who gave us details on the excellent progress that ESS Bilbao team is making in the development of this next generation backscattering neutron instrument.*

*In this issue, we wish to introduce you as well IMoH 2022. An international conference that will gather some of the main European experts in neutron science to analyze in depth the promising present and future of HiCANS, high-energy compact accelerator-based neutron sources.*

*Last but not least, we share with you the journey towards consolidating our core values as part of the rolling out of a new strategy and the establishment of an advanced management system within our organization.*

*I hope you will find this newsletter interesting and exciting.*

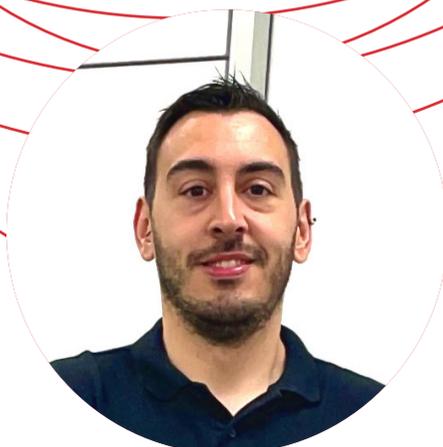


# IMOH22

INTERNATIONAL MEETING ON CHALLENGES  
AND OPPORTUNITIES FOR HICANS

JUNE, 20-22, 2022

BIZKAIA SCIENCE &  
TECHNOLOGY PARK  
LEIOA (BASQUE COUNTRY)



# The heart of ESS bears ESS Bilbao's stamp

**A Basque discover, a trip back three centuries later**



*Click on the image to see the video*

When the D'Elhuyar brothers, at the end of the 18th century, gave birth to the element number 74 of the periodic table, symbolized with the W, of Wolfram, after the implementation of the doctrine learned in Upsala, nothing made them think that said material would return to the alma mater country in his academic studies to be the heart of one of the most relevant research infrastructures of the 21st century, the European Spallation Source (ESS)

History repeats itself and, three centuries later, Spain and Sweden come together again around this material,

tungsten, making it the core element at the heart of the ESS. After successful final tests of the assembled Target wheel, shaft and drive unit in Galicia, these fundamental technical components have been transported by special trailer across Europe, arriving on the ESS site in Lund, Sweden. The target system components are a key in-kind contribution from Spain, provided by ESS Bilbao and its industrial suppliers AVS, Nortemecánica and Thune Eureka. Spain is an essential contributor to the construction of the ESS and has been strongly engaged in the project since the very beginning.

*The spallation process takes place when the accelerated proton beam hits the wolfram bricks of 11 tonne target wheel.*

The Target wheel, shaft and drive unit, key technical components, have been developed and manufactured by in-kind partner ESS Bilbao and will be installed at the core of the ESS Target station.

### **Multifaceted project**

This is a complex, multifaceted project that requires building expertise on every level of engineering, from the basics of meeting stringent seismic and safety requirements to integrating thousands of technical specifications into the brute force construction of massive amounts of steel and concrete. At its heart is the target system itself, where neutrons are generated for use in scientific experiments at a rate of  $10^{18}$  per second.

The spallation process takes place when the accelerated proton beam hits the wolfram bricks of 11 tonne target wheel. This will produce neutron brightness for scientific experiments across multiple disciplines. The neutrons are directed through moderators and neutron guides to the scientific instruments where they are used for experiments.

*“Participating in the design, manufacture and testing of the target system for this leading neutron research infrastructure in Europe has qualified ESS Bilbao as an international benchmark for target technologies,”* said





Fernando Sordo, Head Target division at ESS Bilbao. *"Thanks to the skills and efforts of our dedicated team, we rose to the challenge that we took on."*

Around 15 engineers from ESS Bilbao have been involved in the project for more than 5 years to reach and achieve the initial goals: Supply as a turnkey product, the conceptual design, detail design, manufacturing and assembling of all the components for the ESS Target Station. This includes, the coordination of the design process including all relevant interfaces with stakeholders and the development of the needed expertise and technical capacities for the design of critical components under high radiation environment for science facilities.

*"Our researchers and science industry will benefit from the in-kind contributions delivered by ESS Bilbao to the world-leading research facility ESS, and these deliveries positions Spain as a driver of European science, technology and innovation",* said Mario Pérez, ESS Bilbao Executive Director. *"It goes without saying that the capabilities of our Industrial partners AVS, Nortemecánica and Thune Eureka have been also instrumental for this success, in an excellent collaboration with our team and ESS."*



***Successful final test of  
assembled components  
of target system:  
Wheel, shaft and drive unit***



**Research opportunities**

The multidisciplinary research facility ESS, based on the world's most powerful neutron source, will provide unique research opportunities for thousands of scientists from all over the world, benefitting the development of better batteries, new medicines and more sustainable materials. ESS has 13 member countries, that together fund and build the next-generation research infrastructure, to a large extent through in-kind contributions in the form of technical equipment, services and personnel.

At ESS, the neutrons needed for research will be generated in the spallation process, when the target consisting of the neutron-rich material tungsten is hit by an accelerated proton beam. The target station monolith including 6,000 tonnes of steel shielding, is the place where the proton beam enters to the monolith as well as of the 42 double decker neutron beam line penetrations.

The Target wheel measures 2.5 metres in diameter, weighs 11 tonnes and contains 7.000 wolfram bricks.

Wolfram is a natural element found in rocks and minerals. It is a metal whose main characteristic is its very high fission point, which allows it to withstand high temperatures with good mechanical properties. The rotating helium-cooled ESS tungsten target wheel is a novel design, developed specially to meet the high neutron flux requirements of ESS, which will deliver more neutrons for research than any other similar facility in the world. All the components target wheel, shaft and drive unit delivered from ESS Bilbao to ESS in Lund are the best proof of Spain's advanced technological and industrial capacity.

Before the final Installation, towards autumn this year, at the Target Monolith Vessel, the target wheel, shaft and drive unit will undergo thorough testing in the so called ESS Mock-Up Test Stand at Lund.

# IMoH2022, first international meeting on the challenges and opportunities of compact neutron sources



IMoH22

INTERNATIONAL MEETING ON CHALLENGES  
AND OPPORTUNITIES FOR HICANS

JUNE, 20-22. 2022

BIZKAIA SCIENCE &  
TECHNOLOGY PARK  
LEIOA (BASQUE COUNTRY)

First meeting in Spain dedicated monographically to the HICANS, compact facilities that provide access to experimentation with neutrons for scientists and students

From June 20 to 22, the Campus of the University of the Basque Country in Leioa will host the 1st International Meeting on Opportunities and Challenges for HICANS (IMoH2022). The event will bring together some of the leading European experts in neutron science, who will examine the state of the art and the development potential of HICANS, compact high-intensity neutron sources.

IMoH2022 will be the first conference held in Spain devoted exclusively to HICANS. Large universities and research centres can house this revolutionary compact technology, making it easier for scientists and students to access neutrons. This will allow them to carry out previous experiments to characterize the matter that will later be developed in large facilities, such as spallation sources, nuclear reactors, etc.

## Open registration

ESS Bilbao, BCMaterials, CFM Donostia and Ineustar, reference centers on neutron sciences and technologies organize this international meeting, whose registration is now open through the event website: [www.imoh.eu](http://www.imoh.eu)

***From June 20 to 22, the Campus of the University of the Basque Country in Leioa will host the 1st International Meeting on Opportunities and Challenges for HICANS (IMoH2022)***



***Estefanía Abad -ESS Bilbao- and Raquel González -BCMaterials- chairs of IMoH2022***



The applications that neutron research offers cover multiple areas of life, from medicine to biotechnology, the energy sector or telecommunications. IMoH2022 will accommodate attendees of a multidisciplinary nature:

- Researchers and professors from universities and research centers, highly specialized in neutron and material sciences.
- Companies from different sectors related to neutron science
- Students who want to access the knowledge of the main European experts in this field.

#### **Frontline speakers**

IMoH2022 features leading European speakers in neutron science. 5 plenary sessions and 6 guests, among whom, the following stand out:

- Thomas Brückel, Director of the Jülich Centre for Neutron Science (JCNS-2).

- Robert McGreevy, Former Director of the ISIS facility at the STFC Rutherford Appleton Laboratory.
- Juan Rodríguez Carvajal, Senior Fellow of the ILL- Institut Laue-Langevin.
- Tommy Nylander, Professor at the Physical Chemistry Division of the University of Lund.
- Ferenc Mezei, European Spallation Source, ESS Lund / Mirrotron.
- Caroline Boudou, ILL- Institut Laue-Langevin.

#### **Open reception of abstracts**

In addition, the IMoH2022 program will be completed with 13 oral presentations and a selection of posters selected from among all those scientists.

The congress also includes parallel activities, such as visits to the ESS Bilbao facilities in the Zamudio Technology Park and to BCMaterials, on the Leioa campus, as well as the gala dinner, among other events.

Alexander Conde, *Lead Engineer*

# Making progress at Miracles instrument



MIRACLES is the neutron time-of-flight backscattering spectrometer of the European Spallation Source. ESS-Bilbao is the primary partner in the design, construction, installation, and commissioning of the instrument, with close collaborations with the University of Copenhagen and the European Spallation Source.

MIRACLES will be a next generation instrument, revealing dynamic processes over a wide energy range, it will serve life science, polymer science, energy materials, magnetism studies, among others.

Currently, MIRACLES project is under detailed design phase and start of manufacturing. Alex Conde, Lead Engineer from Instrument division at ESS Bilbao, give us more details:

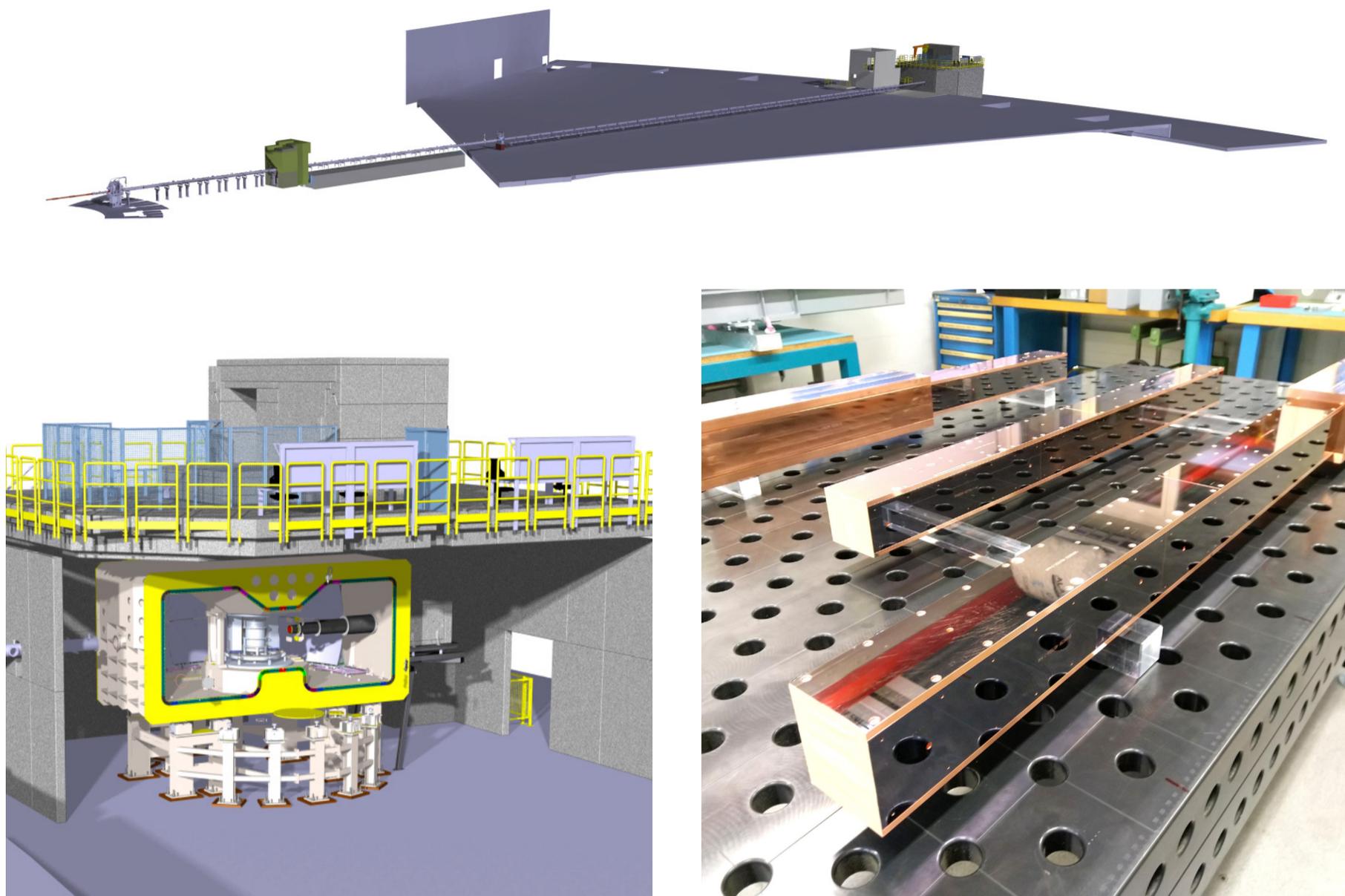
## **What has assuming the leadership of one of the ESS instruments meant for you?**

The design work of the different parts of the instrument, as well as the coordination with the rest of the team and the suppliers, is a personal and professional challenge. The engineering that the spectrometer entails in its design is complex due to the large number of high-precision components that make it up

## **In what state/status is the MIRACLES project?**

During the last years we have been maturing the designs and generating the necessary documentation to be able to start the bidding processes for the manufacture of the various systems.

If we divide the project into 4 large areas, we will have the area inside the bunker, which is the one closest to the target; the zone outside the bunker, which is the guide system of the instrument; the end-station, where the experiments are carried out and the cave area and the experimental station.



The current plan is to approve these designs during the last half of 2022 and 2023 to start assembly during 2023.

**What are the next steps in the development of the instrument?**

The area inside the bunker is the one that is in the most advanced state, with its assembly scheduled for the end of 2023. It would include the guide system, the choppers and the bunker wall insert, as the most outstanding elements.

The next package would include the installation of the experiment vessel together with all the elements that define the characterization system, scheduled to begin in mid-2024.

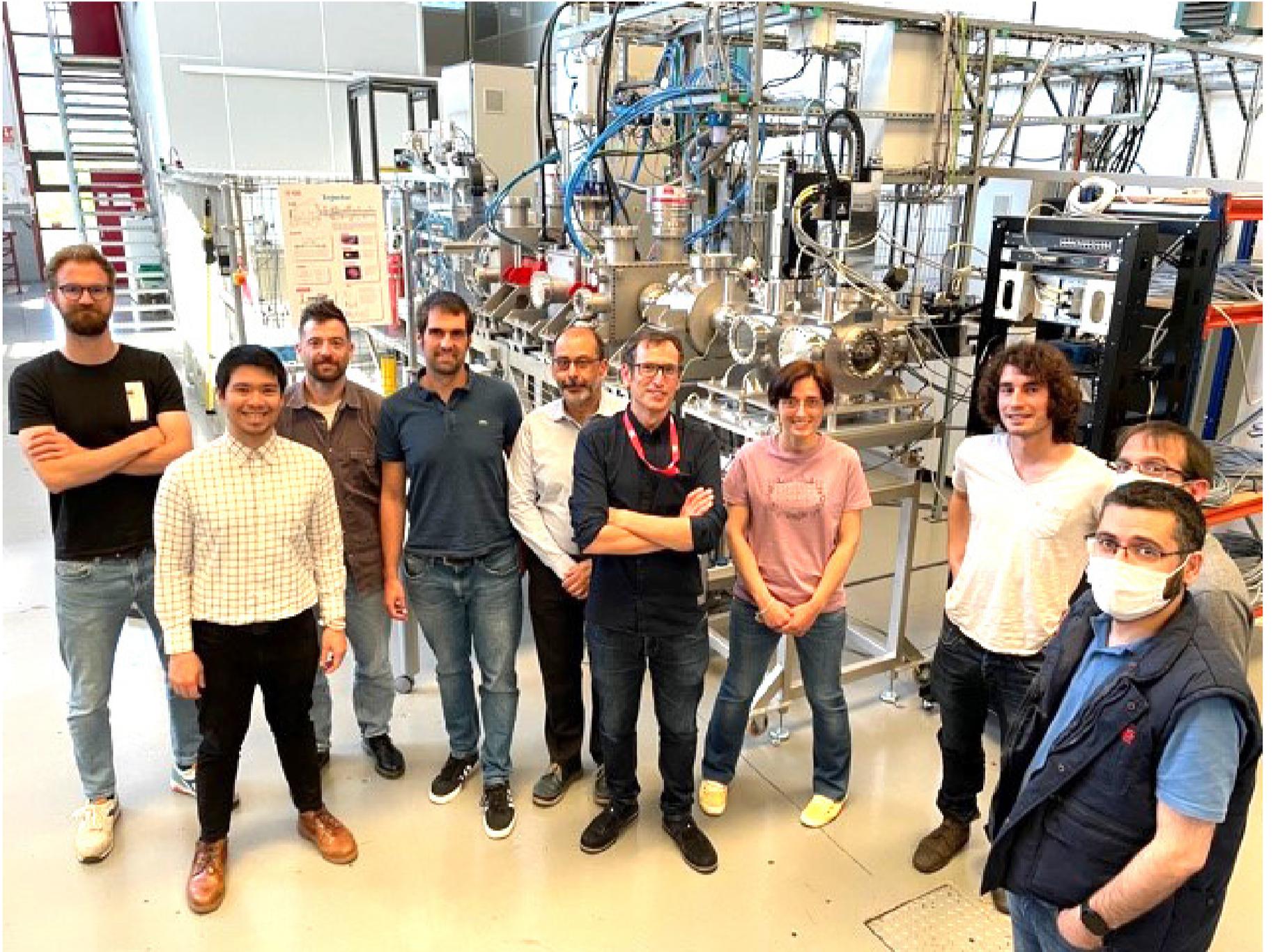
To conclude the installation, I would subtract the guide system from outside the bunker and the elements that make up the experimental station (structures, laboratories, and auxiliaries).

*“The next package would include the installation of the experiment vessel together with all the elements that define the characterization system, scheduled to begin in mid-2024.”*

**What other developments are you carrying out?**

In addition to monitoring the different tenders that make up the project, the MIRACLES team aims to carry out various own projects for the final installation, such as the support system and alignment of the guides, the shutter, the beam-stop of the instrument or the mounting of the silicon mirrors in the analysers.

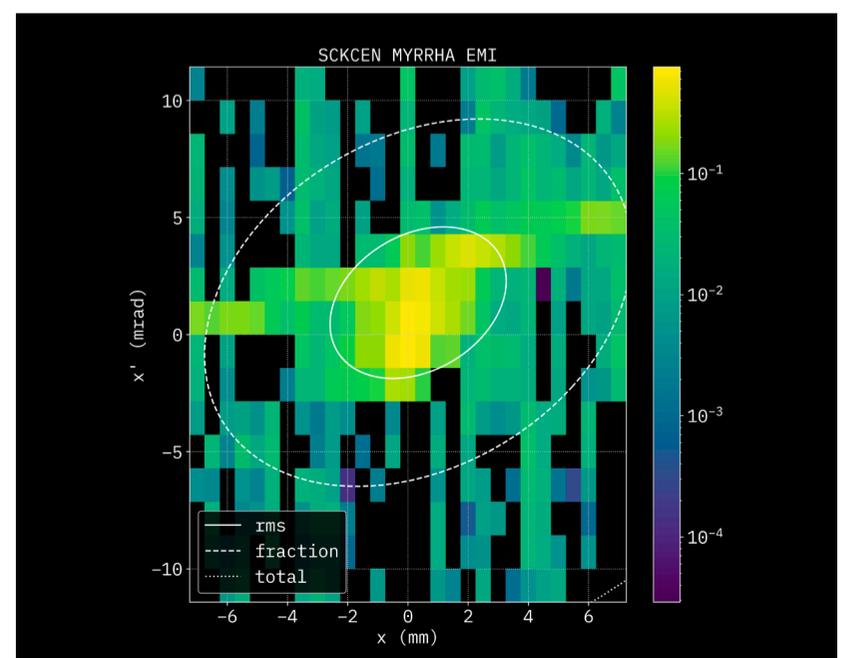
## WHAT'S GOING ON AT ESS BILBAO

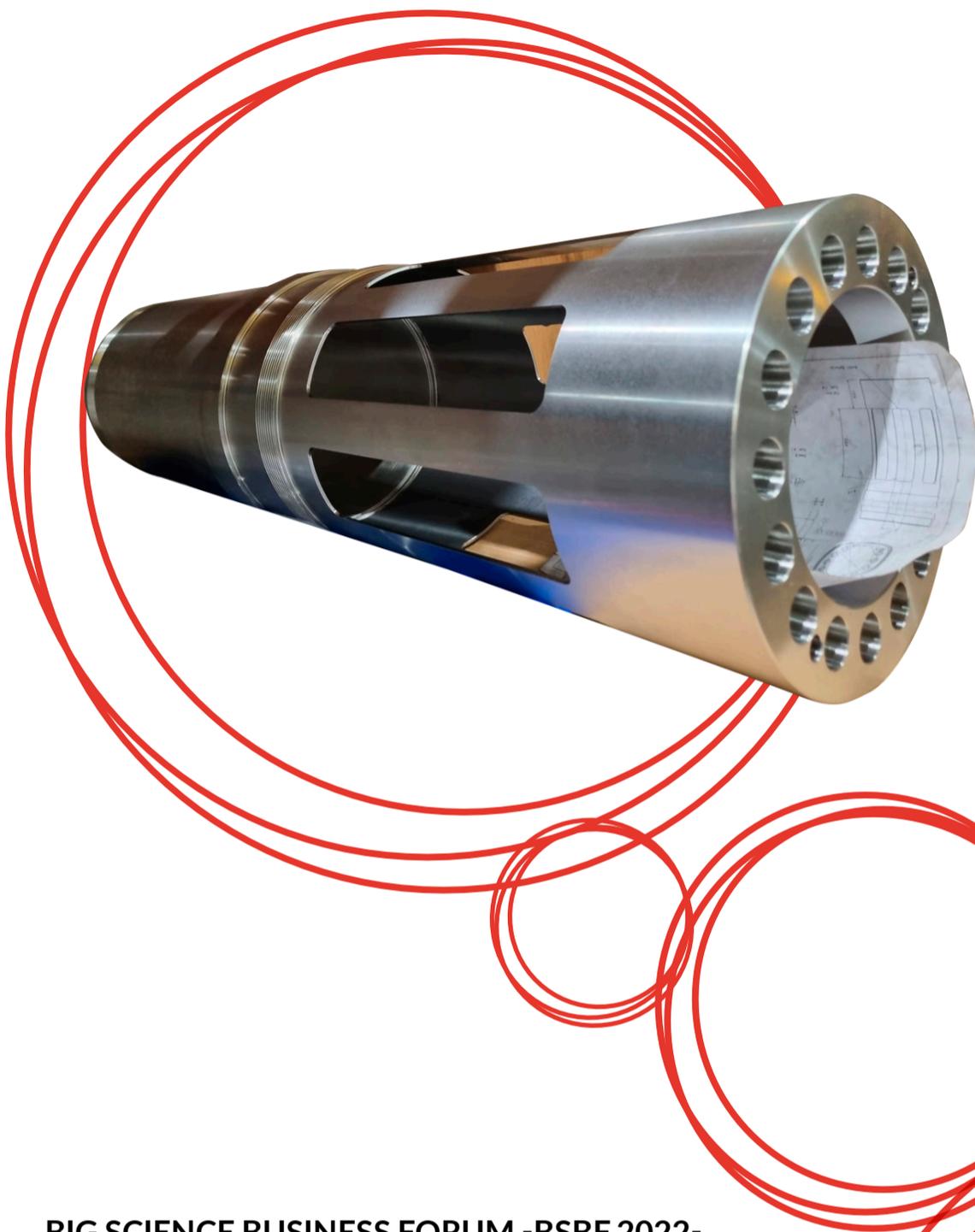


**MYRRHA project. Members of the visiting team of SCK CEN and the local team of ESS Bilbao during the Factory Acceptance Tests (FAT)**

### BEAM TESTS MYRRHA PROJECT

ESS Bilbao is developing, together with its industrial partner Proactive, a “transverse emittance meter based on slit-grid systems for high intensity hadron machine” for SCK CEN in the context of the linear accelerator of the MYRRHA project. Achieving a major milestone close to delivery, the beam tests carried out at the ESS Bilbao facilities in Zamudio a few days ago were completed with extraordinary positive results. Members of SCK CEN cooperated with ESS Bilbao during the tests, showing the constructive collaboration between the teams.





## ROTATORY UNION

The Factory Acceptance Tests (FAT) of the rotatory union are taking place at AWGE facility in Cantabria before being shipped to ESS in Lund. The rotatory union is the last Target System In Kind contribution from ESS Bilbao to ESS project. The rotary seal is the component that allows the rotation of the shaft, maintaining the vacuum and allowing the circulating gas (helium) to cool the wheel.

## BIG SCIENCE BUSINESS FORUM -BSBF 2022-

ESS Bilbao will actively participate as an Affiliated Big Science Organization (ABSOs) institution at BSBF 2022, that will be held in Granada next October. ABSOs are European or large national Big Science organisations that procure European-wide or internationally. They will be mainly single-sited facilities that have a significant construction budget or upgrading projects in the period 2022-2026 and have an interest in communication with industry regarding upcoming business opportunities and procurements that are open for European industry.

BSBF is a business-oriented congress which congregates all the European Research Infrastructures, focused on technology and with the aim to be the main meeting point between Research Infrastructures and industry.

**Big Science  
Business  
Forum  
2022**

# OUR VALUES KEEP US GROWING FOR THE FUTURE

ESS Bilbao is immersed in a process of change towards an advanced management system seeking to establishing long-term objectives and consolidating our own values and culture to keep us growing as a sustainable organization.

Values are an essential part of our culture, providing the direction to be followed by each of us and creating

a healthy work environment that is conducive to attaining our common goals.

These core values guide our daily attitude, behaviour and the decisions we take, and define what the organization is, its philosophy and management.

To fulfil its mission and achieve its vision, ESS Bilbao will be guided by 6 core values.

## **LEARNING AND CURIOSITY** *"WE KEEP GROWING"*

ESS Bilbao is constantly learning and improving the way of doing things better. We always ask questions and search for the answers. Day after day we try to work in a different way to innovate and explore new paths.



## **TEAM WORK**

*"WE OVER ME"*

we stand united being a team and working together for the welfare of all. We share information openly in all the division and groups offering support if needed.



## INCLUSION AND DIVERSITY

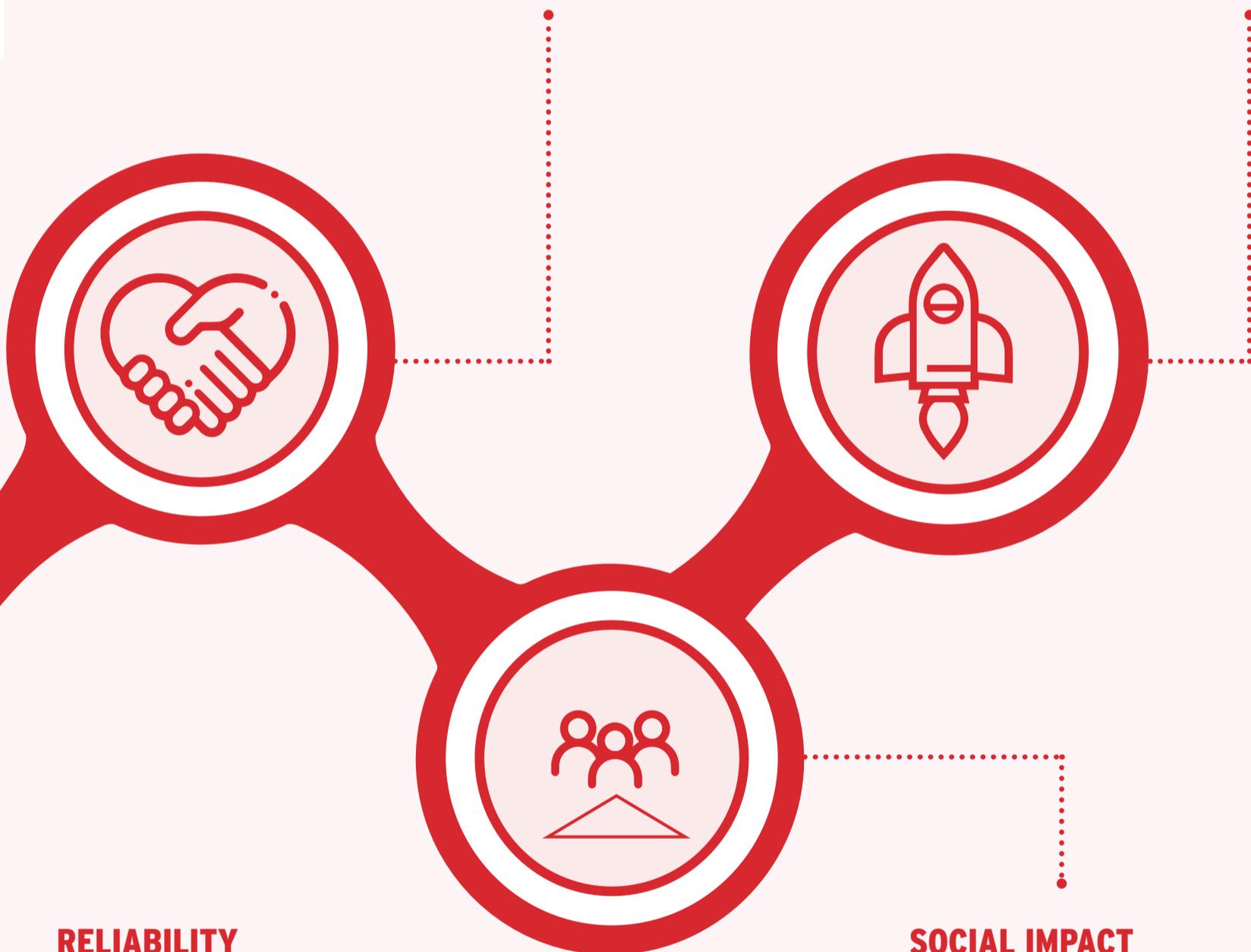
*"WE ENCOURAGE DIFFERENCES"*

we are committed to fostering an inclusive culture where we encourage different opinions and approaches to be heard and come together and build. ESS Bilbao treats people with respect, regardless their status, encouraging differences.

## EMPOWERMENT

*"WE PROMOTE AUTONOMY"*

giving autonomy to our staff, ESS Bilbao brings the opportunity to realise the full potential of every employee. Individual responsibilities and independent decision are the keys to success.



## RELIABILITY

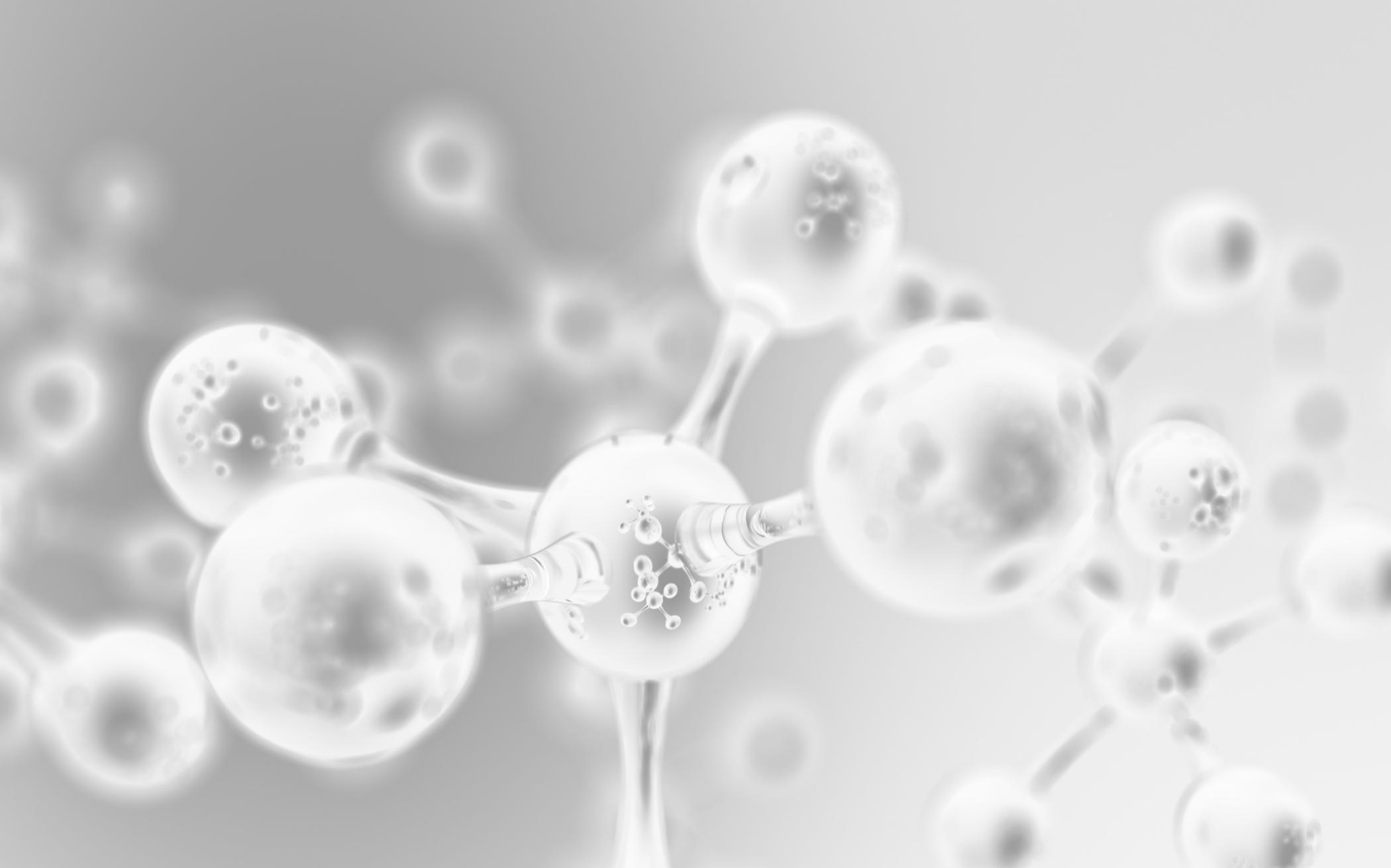
*"WE HONOR OUR WORD"*

we do what we say, and we say what we do. ESS Bilbao honours its word. We deliver our commitments, seeking rigor and technical excellence in all the projects

## SOCIAL IMPACT

*"WE CARE"*

we strive to make an impact and contribute positively to society with our work. We are proud of what we do and how we do it.



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