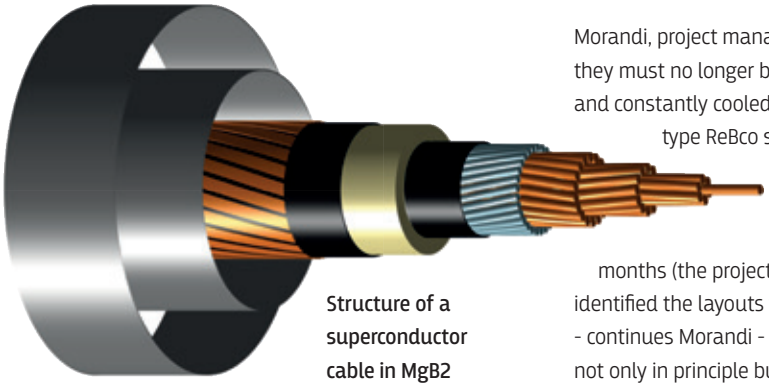
Cables that will transport the energy of the future

Studies are being carried out on superconducting cables for the transfer of higher power and lower voltage electricity, even submarine



Structure of a superconductor cable in MgB2

In the future, energy will be increasingly transferred through superconductors: cables (in many cases submarine, like for example connections with the wind turbines in the North Sea) that can carry electricity, without resistance, and a much higher powers than a conventional cable, without excessive voltage. For this we need to develop innovative technology: this is the scope of "Scarlet", a Norwegian-led Horizon Europe project (Horizon Europe Scarlet Project - Superconducting cables for sustainable energy transition - Ga 101075602), which has among its partners the Department of Electrical Energy and Information Engineering "Guglielmo Marconi" (Dei) from the University of Bologna. "The cables of the future will need to carry a higher amount of power in a single small conduit - points out professor Antonio Morandi, project manager for the University of Bologna - and to do this, they must no longer be made of copper, but made of superconductors and constantly cooled". There are two types to date: one that uses Hts type ReBco superconductors cooled using liquid nitrogen; and a second version that uses magnesium diboride (MgB2) as a superconductor cooled by liquid hydrogen. And the work done in these first few months (the project will continue for another three years) has already identified the layouts for both types of cables. "Starting from this base - continues Morandi - the project has among its aims to demonstrate, not only in principle but also with a degree of advanced technological development, that it is possible to make a superconducting cable using liquid hydrogen-cooled MgB2: a scenario that would play an important role in the future of energy for the planet, and which is also tied to the storage of large amounts of hydrogen".

Magnesium diboride (MgB2) is a material that is easy to produce using established metallurgical techniques, and for which Italy is the leader in production. In short, "Scarlet" will have to try to develop all these technologies while "also demonstrating that their development respects security, monitoring, installation, and management parameters - concludes the professor - Lastly, we also have to figure out how to integrate this technology into the existing network, and how to protect it in the event of damage: this is the aspect that our university is working on closely, and which, in the coming months, we will test with other project partners". ■

Among the aims, demonstrating that a superconducting cable can be made using liquid hydrogen-cooled MgB2

MgB2 superconductors during one of the manufacturing stages