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New Proof of Concept

ERC Funding to demonstrate and validate a scalable process alternative to the incumbent, based on scarce elements, to produce green hydrogen

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The European Research Council (ERC), in its efforts to help ERC grant-holders to bridge the gap between their research and the earliest stage of a marketable innovation, created the Proof of Concept (PoC) funding scheme for researchers who have already been awarded an ERC grant. Not only does this program help grantees to explore the innovation potential of their research and/or commercialize the results of their ERC-funded research, the program complements the efforts of ICFO's Knowledge and Technology Transfer Unit (KTT), which proactively searches for ways to translate newly generated knowledge into new technologies.

In a press release published today by the ERC announcing the award of 134 new Proof of Concept Grants, **Prof. Maria Leptin, ERC President**, described the importance of the grants to Europe's competitivity. ¡¿½'Europe's global standing depends on us championing scientific excellence and building a thriving community of researchers, innovators, and industry leaders. The ERC's Proof of Concept grants play an important role in these efforts. They enable promising research results to evolve into tangible innovations that drive industrial progress and benefit society.¡¿

? Awarded an ERC Starting Grant in 2022, ICFO professor **Dr. Pelayo Garcia de Arquer** receives his first Proof of Concept grant in this, the second PoC round of 2024. His new project, entitled **ARIEL: scaling sustainable Anodes for efficIent water Electrolysis,** is the seventeenth award of this kind for ICFO since the launch of the PoC grant scheme. **The main goal of this project is to demonstrate and validate a scalable process for the synthesis, activation, and implementation of catalysts alternative to iridium for water electrolysis - a critical bottleneck on the path to achieve the global deployment of this technology that is needed to meet carbon emission targets.**

The **CO2 Mitigation Accelerated by Photons group** at ICFO led by Prof. Garcia de Arquer, an active contributor to the institute's **Clean Planet** program, has previously demonstrated, at the lab-scale, the feasibility and potential of cobalt-based anodes as alternative to iridium in proton-exchange membrane water electrolysers (PEMWE), achieving activity and stability at PEMWE-relevant current densities (Science 384, 1373, 2024). ARIEL aims to build on these results translating the original, non-scalable synthesis and manufacturing protocols, into

scalable processes that retain catalytic activity and stability.

i¿½Cobalt, being more abundant than iridium, is still a very troubling material considering from where it is obtained. That is why we are working on alternatives based on manganese, nickel and many other materials. We will go through the whole the periodic table, if necessary,i¿½ explains Prof. Garcia de Arquer of his group's motivation to advance th s technolog

. The aim is to demonstrate a process compatible with kg-synthesis and activatio , prototyping electrodes up to 400 cm^2; and externally validating these, as a prelude to the potential commercial exploitation of this invention. ARIEL will further assess the sensitivity of the different parts of the process on reliability, and perform scale-informed technoeconomic and lifecycle analysis to evaluate different exploitation schemes.