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ICFO Colloquium Series: The high-field path to fusion energy and the SPARC tokamak

PABLO RODRIGUEZ-FERNANDEZ

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12:00
ICFO Auditorium

BIO

Dr. Pablo Rodriguez-Fernandez works as a research scientist at the Massachusetts Institute of Technology (MIT) Plasma Science and Fusion Center. Pablo studied Industrial Engineering a the Polytechnic University of Madrid (2013), and holds a master's degree in Mechanica Engineering from Drexel University (2014). Despite his engineering background, Pabl focused on the study of fundamental transport phenomena with computational plasm physics for this doctoral degree, which he received in 2019 from MIT

In his work, Pablo utilizes state-of-the-art machine learning techniques to solve comple physics and engineering optimization problems. He has been leading the efforts o predicting the performance of the SPARC tokamak, poised to be the firs

magnetic-confinement fusion device to study net-energy plasmas, and his papers on th topic are among the most read in Nuclear Fusion. Despite his young age, Pablo has authore over 30 peer-reviewed journal papers, a third of which as first author. He has been th recipient of important awards during his academic career, including the Manson Benedic Award and Del Favero Doctoral Thesis Prize at MIT, and was listed by Forbes magazine as par of their 30 Under 30 list in Science in 2021

ABSTRACT

The private company Commonwealth Fusion Systems (CFS), in collaboration with the Massachusetts Institute of Technology (MIT), is constructing SPARC, the first magnetic-confinement fusion device that will create net-energy plasmas, a big milestone in the quest for fusion energy. This is an ambitious goal that CFS and MIT expect to achieve in the next few years thanks to the development of high-temperature superconductor technology. Both empirical models and first-principles simulations indicate that SPARC will be able to reach burning-plasma conditions, producing up to 10 times more thermal power than absorbed. This will allow scientists at CFS and MIT study plasmas that are relevant for future electricity-producing power plants. In this talk, Dr. Pablo Rodriguez-Fernandez will introduce basic concepts to understand how thermonuclear fusion works, what the SPARC project is and the advantages of the high magnetic field path to fusion energy.

Hosted by: Prof. Dr. Maciej Lewenstein