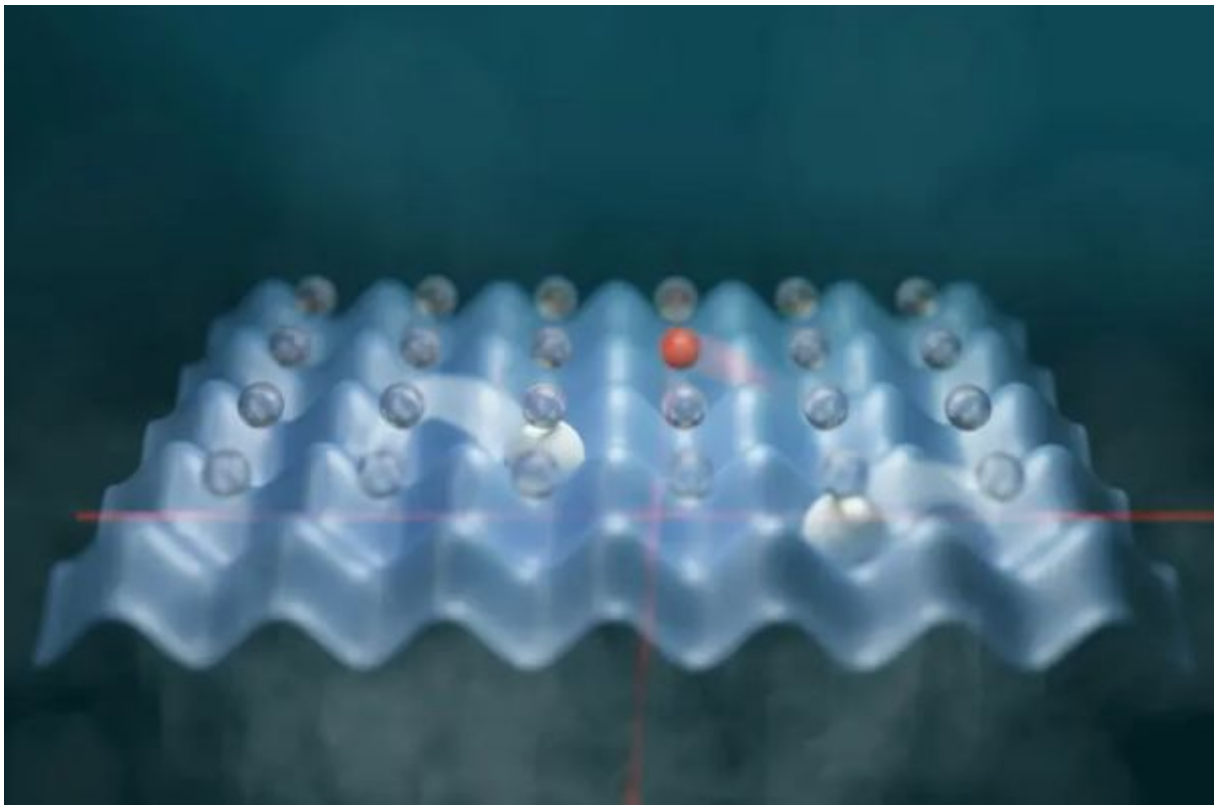


# GEFES 2023 Best Theoretical Thesis in Condensed Matter Physics

## Javier Argüello awarded for thesis i¿½**Synthetic quantum matter using atoms and lighti¿½**

January 24, 2024

GEFES, the Condensed Matter Physics Division of the Spanish Royal Physics Society, has awarded Dr. Javier Argüello Luengo the prize for the best theoretical doctoral thesis i Condensed Matter Physics out of all theses defended between October 2022 and Septembe 2023. His thesis entitled i¿½Synthetic quantum matter using atoms and lighti¿½ w s supervised by ICREA Prof. at ICFO Dr. Darrick Chang and Prof. Dr. Alejandro Gonzalez Tudel , Instituto de Fisica Fundamental-CSIC, and was defended at ICFO on October 21, 202 . Dr. Argüello's doctoral thesis explored new scenarios where the interaction between li ht and matter can help advance our understanding of quantum matter. First, he investiga ed how an individual atom coupled to a cavity can manifest unique optomechanical propert es at the quantum level, due to its low mass and strong interaction with light. In the second p rt of the Thesis, he proposed how some synthetic materials manufactured with light can be used as quantum simulators, thus challenging the limitations that classical comput

rs currently face when exploring quantum phenomena. In particular, he studied ultrac
ld atomic mixtures trapped in optical lattices, where long-range interactions mediated by th
se atoms can play a fundamental role in the simulation of relevant problems in conden
ed matter and quantum chemist
y. Javier was the recipient of various awards during his PhD studies. In 2020 he was recogni
ed by the Ministry of Science, Innovation and Universities of the Government of Spain for
is exceptional undergraduate work in Physics (Premio Nacional Fin de Carrera). In 2022,
he received the RSEF-BBVA Foundation Physics Award for the Best Dissemination Contributi
n for his article ¿Analog quantum simulators: a tool for understanding the matter th
t surrounds us¿ (Simuladores cuanticos analogicos: una herramienta para entender
a materia que nos rodea) published in the Revista Espanola de Fisica, Vol. 35, nº 1, enero-ma
zo 20
1. Following his PhD studies, Javier moved to the Quantum Optics Theory group where
he worked as a postdoctoral researcher led by ICREA Prof. at ICFO Dr. Maciej Lewenstein. M
re recently, Javier has been appointed as an Assistant Professor at the Physics department
of UPC, and continues collaborating with ICFO as a visiting scienti
t. Congratulations Javier for this recognition of your remarkable career to da



Dr. Javier Argüello