

COLLOQUIUM SERIES: The Magic of Moire Quantum Matter

PABLO JARILLO-HERRERO

January 18, 2024

12:00 to 13:00

ICFO Auditorium

BIO:

MIT Professor of Physics since 2008 and Distinguished Invited Professor at ICFO, Prof Pablo Jarillo-Herrero, is a world renowned expert in the area of experimental condensed matter physics, in particular quantum electronic transport and optoelectronics in novel low dimensional materials, such as graphene and topological insulators (TIs). He is well-known for his pioneering research on twisted bilayer graphene, and has received many awards for his career to date including the Spanish Royal Society Young Investigator Award (2007), an NSF Career Award (2008), the IUPAP Young Scientist Prize in Semiconductor Physics (2010), a DOE Early Career Award (2011), a Presidential Early Career Award for Scientists and Engineers (PECASE, 2012), an ONR Young Investigator Award (2013), Breakthrough of the Year Award by Physics World (2018), the Buckley Prize (2019), a Wolf Prize in Physics (2020), the Medal of the Spanish Royal Physics Society (2020), a US National Academy of Science Award for Scientific Discovery (2021), a NIMS Award from the National Institute for Material Science, Japan (2021), a Max Planck Humboldt Research Award (2021), and the Royal Academy of Sciences Ramon y Cajal Medal (2023) among others.

ABSTRACT:

The understanding of strongly-interacting quantum matter has challenged physicists for decades. The discovery five years ago of correlated phases and superconductivity in magic angle twisted bilayer graphene has led to the emergence of a new materials platform to investigate strongly interacting physics, namely moire quantum matter. These systems exhibit a plethora of quantum phases, such as correlated insulators, superconductivity, magnetism, ferroelectricity, and more. In this talk I will review some of the recent advances in the field, focusing on the newest generation of moire quantum systems, where correlated physics, superconductivity, and other fascinating phases can be studied with unprecedented tunability. I will end the talk with an outlook of some exciting directions in this emerging field.

Hosted by Prof. Dr. Adrian Bachtold and Prof. Dr. Frank Koppens.

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