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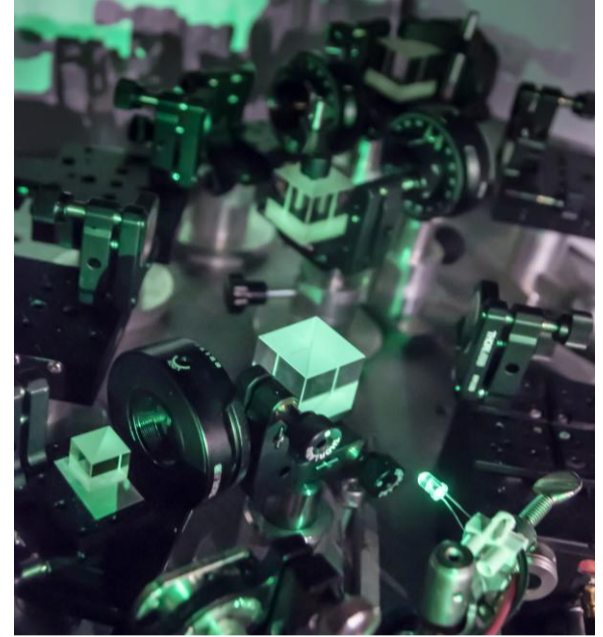


Consiglio Nazionale
delle Ricerche



Istituto Nazionale di Fisica Nucleare

Q@TN Colloquium



Prof. Mikael Rechtsman

The Pennsylvania State University, University Park, PA, USA

Quantum Hall physics with photons

February 25, 2025 – h 14:00

Aula A109 – Povo 1 – Via Sommarive n. 5

Abstract:

When electrons moving in a two-dimensional plane are subject to a perpendicular magnetic field they move in circles called cyclotron orbits as a result of the Lorentz force. Treated quantum mechanically, these orbits become quantized like the orbitals of an atom, forming highly degenerate states called Landau levels. In this colloquium, I will show how we used strain to make photons "feel" a magnetic field and thus form Landau levels in a photonic crystal, despite the fact that photons carry no charge and thus cannot experience the Lorentz force. This increases the strength of interaction between light and matter, which has implications in quantum optics and integrated photonics. Time permitting, I will discuss the related topic of how edge states in a "Chern insulator" photonic crystal can be used to slow down light in a photonic chip over a wide bandwidth.

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with the financial support of

