



Felicitats al nou graduat de doctorat de l'ICFO

El Dr. Geng Li s'ha doctorat amb una tesi titulada "Fourier Transform Infrared Spectroscopy of Twisted Bilayer Graphene"

April 11, 2025

Felicitem al Dr. Geng Li que ha defensat la seva tesi aquest mati a l'Auditori de l'ICFO. El Dr. Li va obtenir el seu Master en Ciència a la University of Buffalo, abans d'incorporar-se al grup de recerca de Quantum Nano-Optoelectronics dirigit pel professor ICREA a l'ICFO el Dr. Frank Koppens. La seva tesi titulada "Fourier Transform Infrared Spectroscopy of Twisted Bilayer Graphene" ha estat dirigida pel Prof. Dr. Frank Koppens.

RESUMEN:

The goal of this thesis is to probe the infrared optical response of twisted bilayer graphene (TBG) using Fourier transform infrared spectroscopy (FTIR). First, I used a commercial FTIR to measure the TBG in the mid-infrared range at room temperature. I improved the device fabrication technique and fabricated the TBG devices with a large area and simultaneously a low inhomogeneity. I observe that the TBG has abundant optical absorption features originating from the interband transitions that are uniquely determined by the twist angle.

Then, I want to probe the interband transition of the TBG that lies in the terahertz range, which involves the flat band of the TBG that hosts strongly correlated effects. I built a homemade FTIR that works in both the mid-infrared and terahertz range. I wired the cryostat carefully and achieved an electrical noise level approaching the Johnson noise limit. By guiding the light from the FTIR into the cryostat, I successfully measured the exciton states in the Bernal bilayer graphene device over a broad spectral range, demonstrating that the system is ready for future experimental study of TBG.

Tribunal de Tesi:

Prof. Dr. Giacomo Scalari, Eidgenössische Technische Hochschule Zürich

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