

Felicitats al nou graduat de doctorat de l'ICFO

El Dr. Geng Li s'ha doctorat amb una tesi titulada i¿½Fourier 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 Ciencia 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 evolves the flat band of the TBG that hosts strongly correlated e?ects. 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 FITR 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, Eidgenossische Technische Hochschule Züric

Prof. Dr. Niek van Hulst, ICF

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