TECHNISCHE UNIVERSITÄT DRESDEN

Bereich Mathematik und Naturwissenschaften Fakultät Physik

PHYSIKALISCHES KOLLOQUIUM

Vortrag: **Dr. Archana Raja**
Lawrence Berkeley National Laboratory,
USA

Thema: **Ultrafast thermal transport at photoexcited 2D van der Waals interfaces**

Zeit und Ort: Dienstag, 18.1.2022, 16:40 Uhr / Online-Kolloquium in Zoom

Zoom-Meeting: Meeting-ID: 881 7310 0748 / Kenncode: PK-21!-AR
https://tu-dresden.zoom.us/j/88173100748?pwd=NFlTSkdtQzZKR3pwdVpoM1kvUlUzdz09

Leitung: Prof. Dr. Alexey Chernikov

Kurzfassung: Two-dimensional (2D), van der Waals crystals allow the creation of arbitrary, atomically precise heterostructures simply by stacking disparate monolayers without the constraints of covalent bonding or epitaxy. Charge and energy transfer processes at these novel junctions is an area of burgeoning interest both from the fundamental and application points of view. At a type II heterojunction between two 2D semiconductors, ultrafast charge transfer has been previously determined to occur on the order of 10's of femtoseconds after photoexcitation. However, the coupling between the lattice degrees of freedom of the photoexcited monolayers remains less understood. We use ultrafast electron diffraction to directly visualize lattice dynamics in the individual monolayers of the van der Waals heterojunction. We can track the transfer of energy from one layer to another by following the change in intensity of the Bragg peaks after photoexcitation. We discover that under photoexcitation, thermal transport occurs at a rate a few orders of magnitude faster than what is explained by vibrational coupling alone, which we quantify by launching phonons across the junction through sub-bandgap excitation. With the aid of first principles calculations, we can shed light on the role of lattice dynamics during ultrafast electronic processes at 2D van der Waals heterojunctions.

Biographie: Archana Raja completed her PhD in Chemical Physics from Columbia University. After spending a year as a postdoc in the Applied Physics department at Stanford University, she joined the Kavli Energy and Nanoscience Institute at UC Berkeley. In July 2019, she became a Staff Scientist at the Imaging and Manipulation of Nanostructures Facility at the Molecular Foundry and was awarded the Early Career Lab Directed Research and Development Award. She is also the recipient of the

Blanche R. and David Kasindorf Fellowship in Physical Chemistry at Columbia University and the Institute Silver Medal at the Indian Institute of Technology in Bombay.

Get-Together

Im Anschluss an das Kolloquium (ca. 18 Uhr) sind Studentinnen und Mitarbeiterinnen eingeladen zu einem online Get-Together mit Dr. Archana Raja. Im einem Zoom Meeting gibt es die Gelegenheit, mit der Referentin ins Gespräch zu kommen und sich über weibliche Perspektiven auf Herausforderungen in Studium und Berufsleben auszutauschen.

The colloquium will be followed by a Get-Together with Dr. Archana Raja in Zoom (about 6 p.m.). Female students and staff are invited to talk to the speaker and discuss female perspectives on challenges in studies and professional life.

https://tu-dresden.zoom.us/j/81965591630?pwd=eGN4VEN6NzFDV25zSkxDVndZaWlXdz09

Meeting-ID: 819 6559 1630

Kenncode: Get!Tog1