

Theoretical Physics Group

Who are we
and
what are we doing?

Condensed matter physics then ...

...discipline that treats the thermal, elastic, electrical, magnetic, and optical properties of solid and liquid substances (Britannica)

and now ...

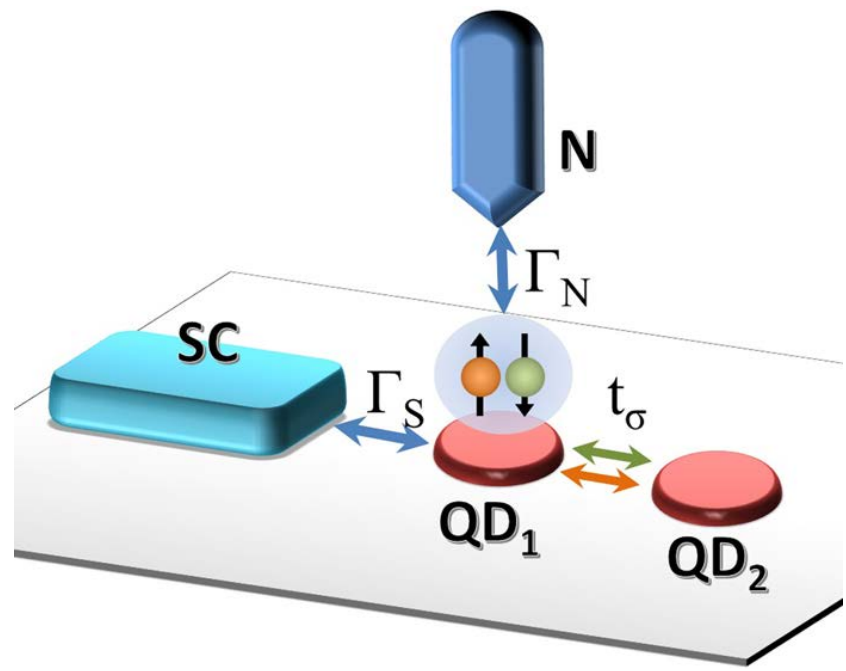
Artificial materials & synthetical systems

Newly discovered materials

Systems far from equilibrium

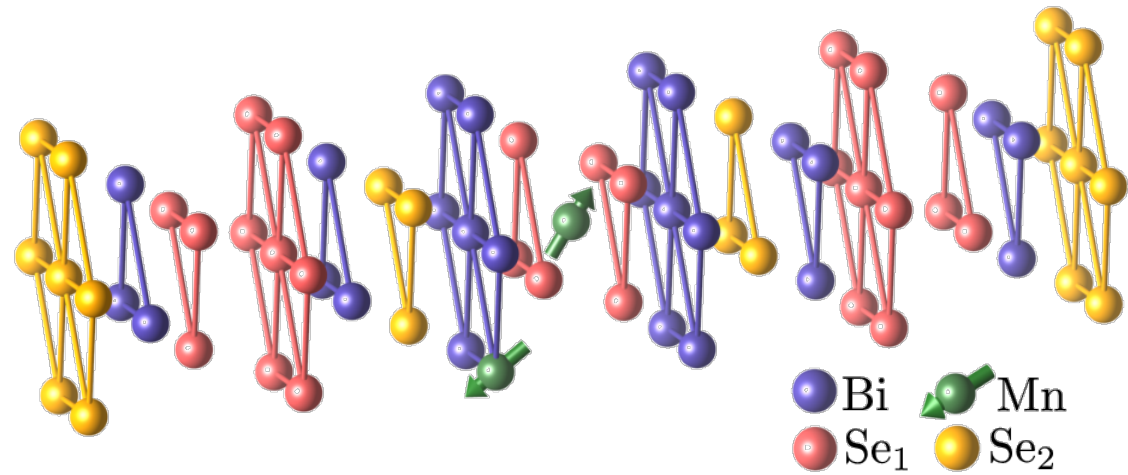
New computational/numerical methods

Superconducting nanohybrids & non-equilibrium phenomena



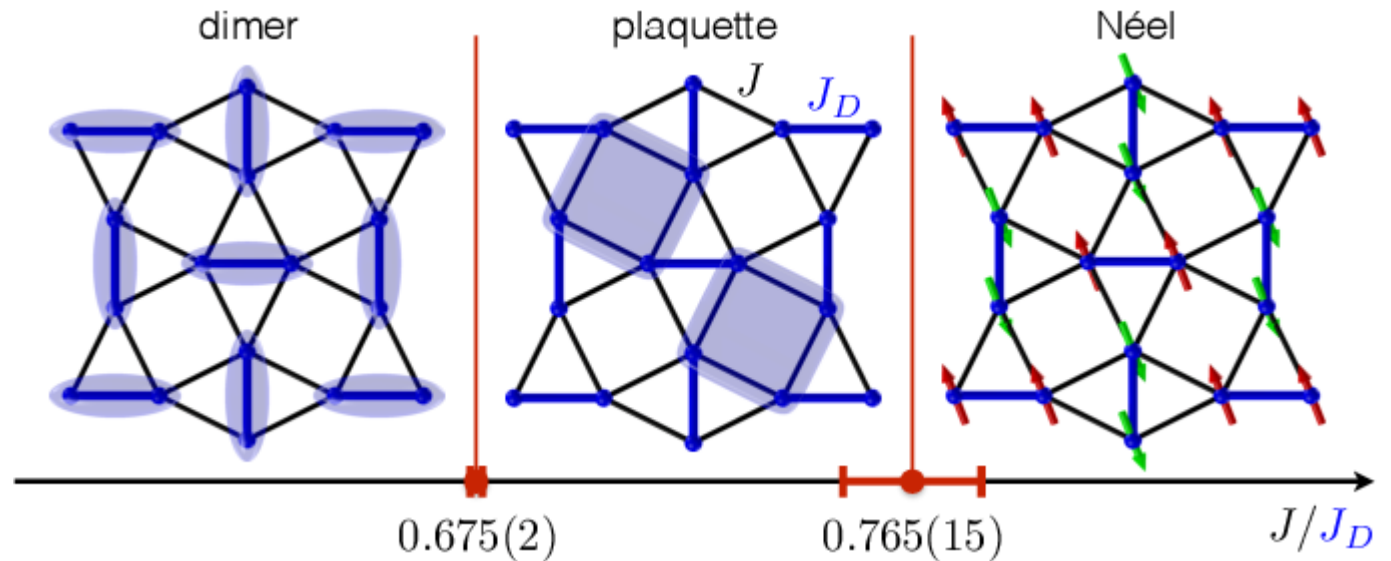
Important for future nanoelectronic quantum devices

Topological & 2D materials



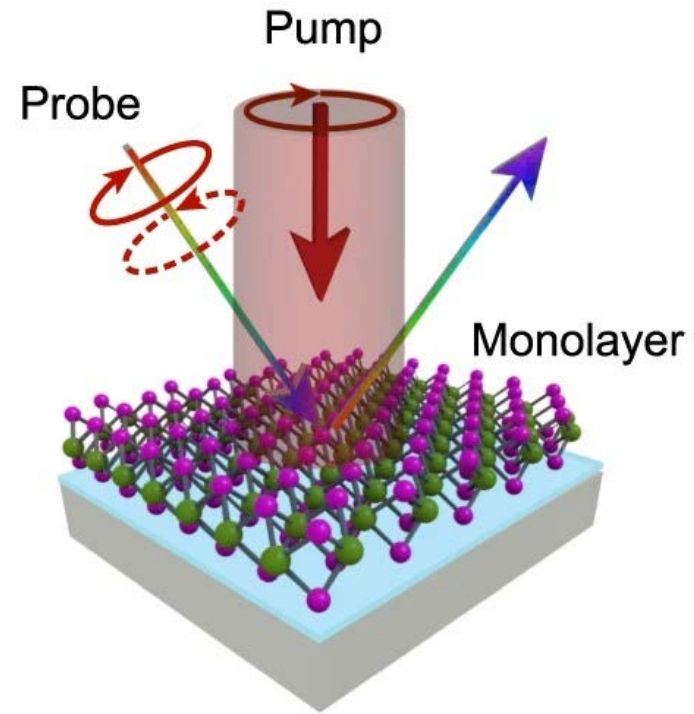
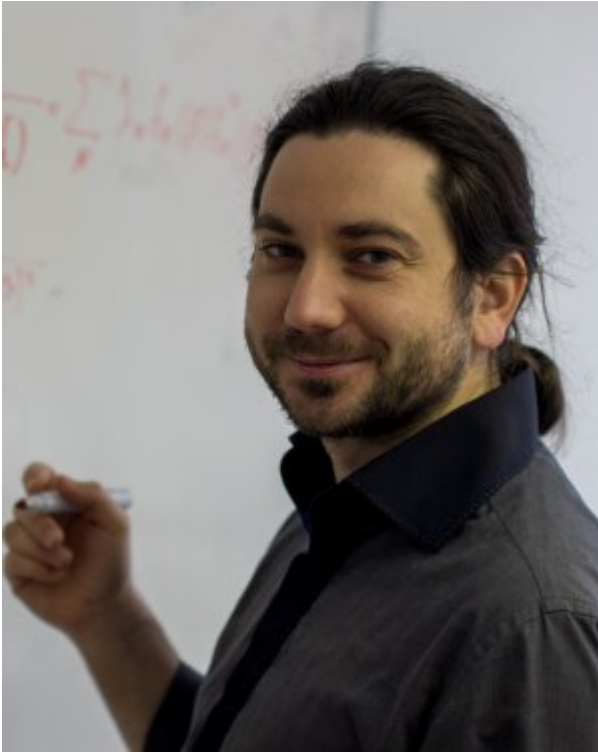
Novel materials and systems with unusual magnetic, electronic and optical properties

Machine learning & new methods in condensed matter physics

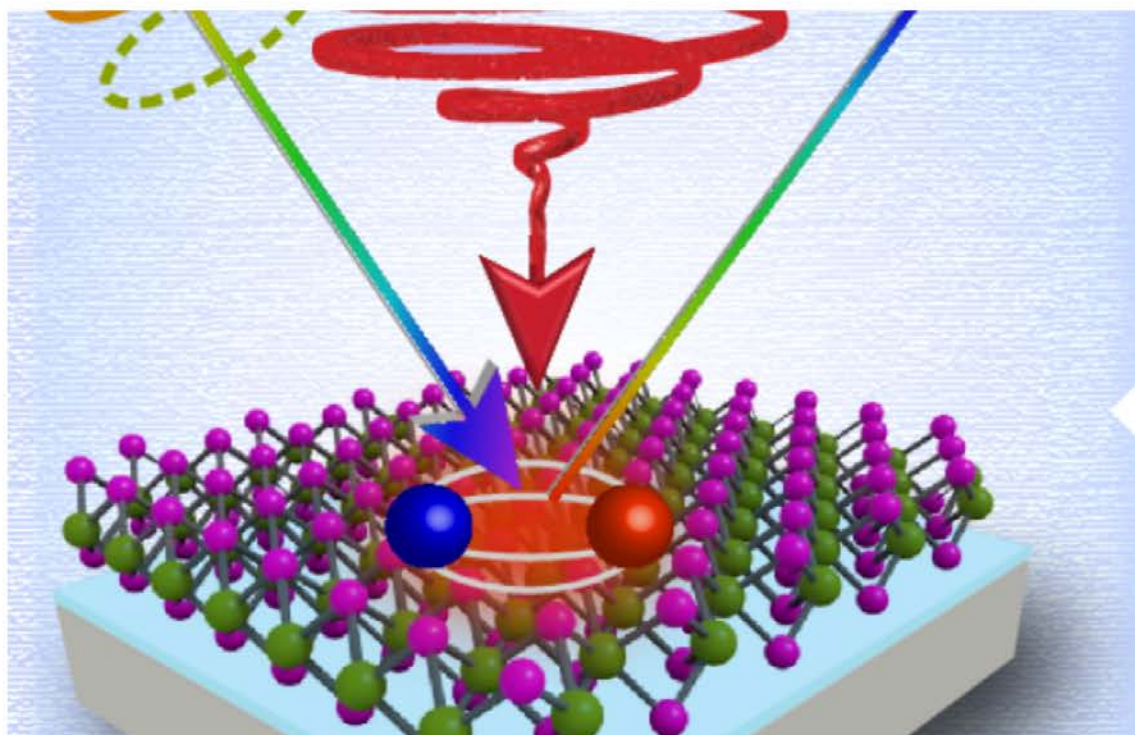
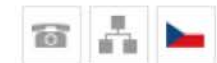
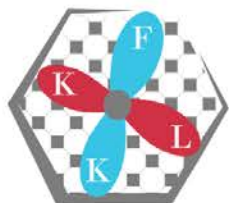


The properties of the complex systems, which can't be solved by standard methods, can be obtained with machine learning

Ultrafast physics & light-matter interaction



Novel optical phenomena and devices based on 2D materials



REVOLUTIONIZING ELECTRONICS: INNOVATIVE WAY TO CONTROL EXCITONS IN SEMICONDUCTORS

Scientists from our faculty have made a groundbreaking discovery in the field of optoelectronics. Our research demonstrates a new way to manipulate excitons in semiconductors using coherent optical interactions, opening the door for ultrafast valleytronics operating at multiterahertz frequencies.

[read more](#)