

1	CEIPEX RESEARCH TOPIC LEVEL 2: Magneto-optical & THz spectroscopy
2	RESEARCH GROUP: Magneto-optical & THz spectroscopy (Petr Neugebauer)
3	TOPICS/FOCUS: Manipulation and Detection of Molecular Magnets at Two-Dimensional van der Waals Interface
4	SUMMARY: Modern silicon-based electronic devices are rapidly approaching their fundamental performance limits. Quantum technologies are emerging as a promising pathway to overcome these constraints, enabling a new generation of computing and data-processing capabilities. This multidisciplinary postdoctoral project focuses on exploring magnetic molecules (qubits) deposited on weakly coupled two-dimensional (2D) materials such as graphene or transition metal dichalcogenides (WS ₂ , MoS ₂ , TI: Bi ₂ Te ₃ , Bi ₂ Se ₃), which serve as templates for molecular assembly. The main objective is to develop a reliable protocol for depositing molecular magnets on 2D materials, paving the way for high-density data storage, advanced data processing, and quantum computing applications. The research involves nanofabrication and processing at CEITEC Nano, complemented by comprehensive characterization using the FRASCAN spectrometer developed within our group. The resulting molecular spintronic devices will be thoroughly analyzed through electrical transport measurements and spin resonance spectroscopy. A further objective is to develop a methodology for addressing individual qubits using selective spin resonance techniques, such as magnetic resonance imaging. This work is carried out in close collaboration with CEITEC VUT, CEITEC MUNI, and our international partners, combining expertise across physics, materials science, and quantum technology.
5	RG WEBPAGE/CONTACT: https://spectroscopy.ceitec.cz/ Assoc. Prof. Dr. Petr Neugebauer