

# Applied photonic structures: from spectroscopy to smart devices

## VŠB - Technická univerzita Ostrava

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Together.*

# VSB - Technical University of Ostrava



VSB TECHNICAL  
UNIVERSITY  
OF OSTRAVA

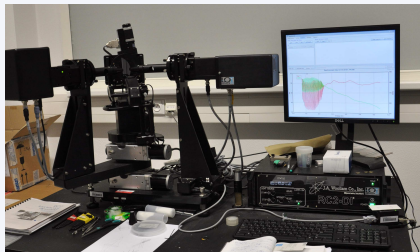


- research activity in optics
- offered collaboration
- 24th CPSOC 2026

National supercomputing center (first quantum computer)

# Research

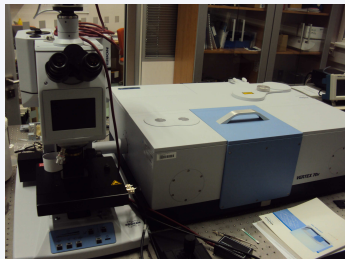
## 1. Spectroscopic ellipsometry in wide spectral range



### Experimental equipment

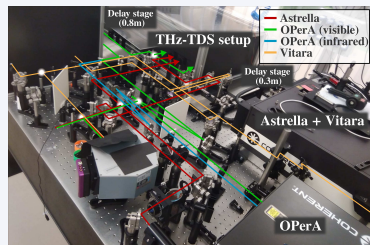
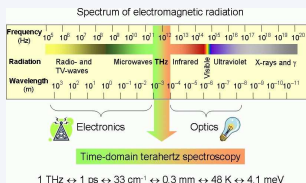
- RC2-DI – Woolam Company (dual rotating compensator ellipsometer)
- complete Mueller matrix spectra
- spectral range 0.74 to 6.42 eV (wavelength 193 nm – 1.7  $\mu\text{m}$ )

- Infrared spectrometer FTIR Bruker Vertex 70v
- near, mid and far infrared spectral range
- transmission, reflection, ATR, microscopy

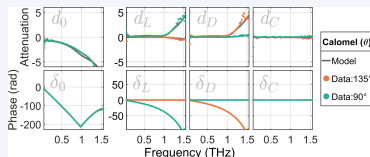


# Research

## 1. Terahertz complete Time-Domain Spectroscopic Ellipsometry (THz-cTDSE)



- measured waveform using ultrashort fs optical pulses
- spectrum calculated using complex Fourier transform
- applied for contactless measurement of electrical properties



P. Kolejak, J. Liu, R. Silber, M. Micica, O. Ballada, . Barta, R. Lebrun, N. Tiercelin, M. Vanwolleghem, and K. Postava, Terahertz time-domain ellipsometry with spintronic emitters: Pauli coefficients as a superior alternative to Jones and Mueller matrices, IEEE Trans. Terahertz Sci. Technol. 15, 606–621 (2025).

# Research

## 2. Diffractive and security holographic optics

### Complete security holography prototyping at VSB-TUO

Supercomputer Center



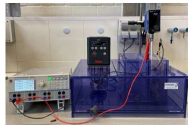
Laser lithography



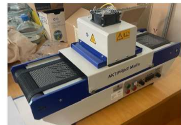
Thin film sputtering



Electroplating



UV foil printing



Data preparation for lithography



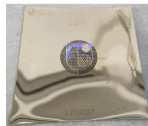
Hologram in photoresist



Metal layer for electroplating



Nickel sheet



Copy into plastic foil

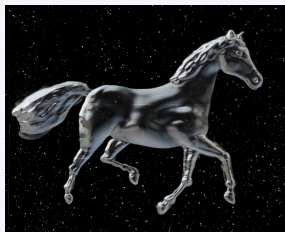
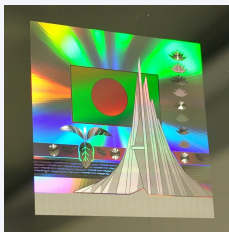


Patents: T. Kohut, L. Kotacka, K. Postava, D. Tomlinson, AU2025903742 - Security feature, security document and methods of manufacture, AU2025903740 - Micro-optic security feature.

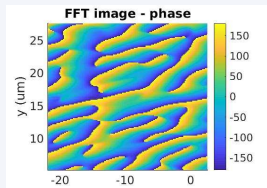
# Research

## 2. Diffractive and security holographic optics

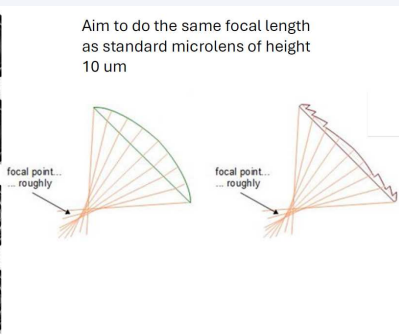
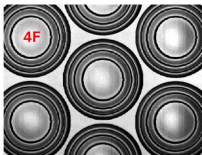
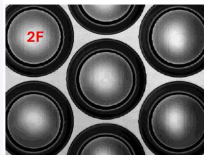
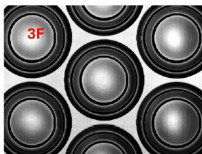
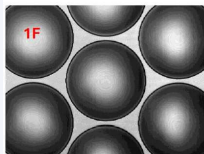
applied security holograms made at VŠB-TUO



computer generated holograms and polarization effects

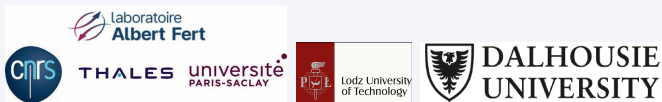


### Fresnel microlenses made at VŠB-TUO



# International collaboration with academic and industry

- **academic collaboration** – joint supervision of doctoral studies



- **industrial collaboration**



- **semiconductor ecosystem** – SiC material technology



# Conclusion

## What we are offering

- complete ellipsometric and spectroscopic measurement in wide spectral range ( $\lambda = 190 \text{ nm} - 1 \text{ mm}$ ), including anisotropy
- knowledge in optics, nanooptics and photonics
- design and optimization of photonic structures using advanced modeling tools

## What we are looking for

- collaboration with industry
- partners for joint research and development projects

Contact: [kamil.postava@vsb.cz](mailto:kamil.postava@vsb.cz)

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# Společný Workshop ČOK a Polského fotonického klastru

24th Czech-Polish-Slovak Optical Conference – September 14-18, 2026 &  
Joint Workshop of Czech optical Cluster and Polish Photonic Cluster –  
September 16-17, 2026.



Hotel Horizont, Pec pod Sněžkou

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Hotel Horizont, Pec pod Sněžkou  
16.–17. září 2026

- možnost stánků během celé konference, prezentace produktů
- setkání a prezentace klastrů
- přednášky v rámci odborných sekcí
- turistika, Sněžka, lanovka

<https://cpsoc2026.vsb.cz/>

# Společný Workshop ČOK a Polského fotonického klastru

16.–17. září 2026 Program:

- Konferenční večere – středa 16. 9. 2026
- Plenární sekce klastrů, oběd, Tématicky zaměřené sekce (Industrial optics) – čtvrtek 17. 9. 2026
- Expozice produktů

	Monday 14.9.2024	Tuesday 15.9.2024	Wednesday 16.9.2024	Thursday 17.9.2024	Friday 18.9.2024
08:00-09:00		Breakfast (45 min)	Breakfast (45 min)	Breakfast (45 min)	Breakfast (45 min)
09:00-09:15					
09:15-09:30		Sekce 5 (90min)		Sekce 11 (90min)	Sekce 15 (90min)
09:30-09:45					
09:45-10:00		Coffee break (30 min)		Coffee break (30 min)	Coffee break (30 min)
10:00-10:15					
10:15-10:30		Sekce 6 (90min)		Sekce 12 (90min)	Sekce 16 (90min)
10:30-10:45					
10:45-11:00		LUNCH (1,20min)		LUNCH (1,20min)	LUNCH (1,20min)
11:00-11:15					
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