



中国海洋大学  
OCEAN UNIVERSITY OF CHINA

## 学术报告

报告人	Prof. Jozef Kaiser
单位	捷克 布尔诺理工大学
报告题目	Laser-Induced Breakdown Spectroscopy Background and Applications

### 报告内容:

LIBS technique enables the fast and even *in-situ* and stand-off elemental analysis of solid, liquid or gaseous samples from various scientific and industrial areas.

- Clinical research (detection of nanoparticles and heavy metals in organs)
- Foundry and metallurgy (detection of C, S, P, fast on-line quality control)
- Automotive (characterization of thin surface coatings, selective detection of elements in materials layers)
- Mining and extraterrestrial research (rock identification, quantification of trace elements)
- Agriculture and environmental diagnostics (detection of fertilizers and toxicity contamination)
- Archaeology, forensics (e.g. braking track detection), civil engineering, etc

### 报告人简介:

Jozef Kaiser 教授为捷克布尔诺理工大学中欧理工学院 (CEITEC) 教授, 在激光诱导击穿光谱 (laser-induced breakdown spectroscopy)、X 射线显微成像 (X-ray microradiography)、微纳计算机断层扫描 (micro and nano computed tomography) 等方面具有 20 多年的研究工作经历, 与国际上多所著名实验室保持合作关系, 包括意大利的里雅斯特同步加速器、美国橡树岭国家实验室、中国科学院沈阳自动化研究所。发表各类文章 163 篇, Web of Science 他引 1794 次, H 指数为 25, 曾担任第 10 届欧洲激光诱导击穿光谱学学术年会 (EMSLIBS 2019) 主席。(个人简历附后)

个人主页: <https://www.ceitec.eu/materials-characterization-and-advanced-coatings-jozef-kaiser/rg6>

时间: 2019 年 11 月 10 日 (星期天) 10:00 – 11:30

地点: 信息学院北楼 A423 联络人: 郑荣儿 / 卢渊 (13853228865)

--信息科学与工程学院 物理系 主办

## Jozef Kaiser

### Research Group Leader

Central European Institute of Technology (CEITEC)

Brno University of Technology

Purkyňova 123, 612 00 Brno, Czech Republic

Researcher ID: D-6800-2012

ORCID ID: 0000-0002-7397-125X

Date of birth: April 06, 1974

<https://www.ceitec.eu/materials-characterization-and-advanced-coatings-jozef-kaiser/rg6>



### BASIC SCIENTOMETRIC INDICATORS

(ISI Web of Knowledge, Thomson Reuters, October 8, 2019)

Hirsch's index: **25**

Total publication number: **163**

Total publication number in last 5 years: **76**

Sum of Times Cited without self-citations: **1794**

### EDUCATION / ACADEMIC DEGREES

2013, Full professor, Brno University of Technology (BUT), Brno, Czech Republic

2005, Associate professor, BUT, Czech Republic

2001, Doctoral degree (Ph.D.), BUT, Brno, Czech Republic

1997, Master degree (MSc.), BUT, Brno, Czech Republic

### EXPERTISE

I have over 20 years of work experience and scientific collaboration with a variety of world class laboratories, such as Synchrotron Elettra, Trieste, Italy; Oak Ridge National Laboratory, Oak Ridge, TN, USA; Shenyang Institute of Automation, Shenyang, China. As a Ph.D. student in the team of prof. Reale, University of L'Aquila, Italy I participated on the development of 46.9 nm, capillary-discharge pumped, soft X-ray laser that was put in operation in 2002, as a second worldwide. At Faculty of Mechanical Engineering of BUT and later on at CEITEC BUT I founded and lead a research team dedicated to research of Laser spectroscopy, more specifically to basic research and application of methods LIBS, rLIBS, *stand-off* LIBS, DP LIBS, LIBS + LIFS. In 2011 in cooperation of Elettra Synchrotron in Trieste, Italy we established a research group at CEITEC BUT with a main research topic connected to X-ray microradiography and micro and nano computed tomography (CT). Since this group is internationally recognized and addresses common research projects with laboratories e.g. from Karolinska Institutet, Stockholm, Sweden, or Pasteur Institute, Paris, France. Since 2013 I am leading the Materials Characterization and Advanced Coatings research group, which is one of the main performing research groups at CEITEC BUT.

Between 2011 and 2015 I was the member of the evaluation panel 108 (Material Sciences and Engineering) of the Grant Agency of the Czech Republic and between 2010 and 2015 I served as a member of the main committee of Ioannes Marcus Marci Spectroscopic Society. From 2014 up to 2016 I was the member of the Committee for science, research and innovation of the Czech-Israeli Chamber of Commerce.

### INDEPENDENCE

I consider as my recent TOP achievement the creation and consolidation of the CEITEC BUT's research group Materials Characterization and Advanced Coatings. The research group is focused on both, basic and applied research and has significant publication outcomes in the fields of its expertise. Moreover, the group can effectively transfer the knowledge developed in the center of excellence CEITEC into practice.

### TOP THREE REVIEW PAPERS

**Kaiser, J.**, Novotný, K., Martin, M. Z., Hrdlička, A., Malina, R., Hartl, M., ... & Kizek, R. (2012). Trace elemental analysis by laser-induced breakdown spectroscopy—biological applications. *Surface Science Reports*, 67(11-12), 233-243.

**Pořízka, P.**, Prochazková, P., Prochazka, D., Sládková, L., Novotný, J., Petrilak, M., **Kaiser, J.**, ... & Adam, V. (2014). Algal biomass analysis by laser-based analytical techniques—A review. *Sensors*, 14(9), 17725-17752.

**Pořízka, P.**, Klus, J., Képeš, E., Prochazka, D., Hahn, D. W., & **Kaiser, J.** (2018). On the utilization of principal component analysis in laser-induced breakdown spectroscopy data analysis, a review. *Spectrochimica Acta Part B: Atomic Spectroscopy*, 148, 65-82.

## LIST OF PAPERS/REVIEWS PUBLISHED IN THE LAST THREE YEARS (2017-2019)

Modlitbová, P., Farka, Z., Pastucha, M., **Pořízka, P.**, Novotný, K., Skládal, P. & **Kaiser, J.** (2019). Laser-induced breakdown spectroscopy as a novel readout method for nanoparticle-based immunoassays. *Microchimica Acta*, 186(9), 629.

Modlitbová, P., Hlaváček, A., Švestková, T., **Pořízka, P.**, Šimoníková, L., Novotný, K. & **Kaiser, J.** (2019). The effects of photon-upconversion nanoparticles on the growth of radish and duckweed: Bioaccumulation, imaging, and spectroscopic studies. *Chemosphere*, 225, 723-734.

Modlitbová, P., Novotný, K., **Pořízka, P.**, Klus, J., Lubal, P., Zlámalová-Gargošová, H. & **Kaiser, J.** (2018). Comparative investigation of toxicity and bioaccumulation of Cd-based quantum dots and Cd salt in freshwater plant *Lemna minor* L. *Ecotoxicology and environmental safety*, 147, 334-341.

Modlitbová, P., **Pořízka, P.**, Novotný, K., Drbohlavová, J., Chamradova, I., Farka, Z., ... & **Kaiser, J.** (2018). Short-term assessment of cadmium toxicity and uptake from different types of Cd-based Quantum Dots in the model plant *Allium cepa* L. *Ecotoxicology and environmental safety*, 153, 23-31.

Hrdlička, A., Hegrová, J., Novotný, K., Kanický, V., Prochazka, D., Novotný, J., ... & **Kaiser, J.** (2018). Sulfur determination in concrete samples using laser-induced breakdown spectroscopy and limestone standards. *Spectrochimica Acta Part B: Atomic Spectroscopy*, 142, 8-13.

**Pořízka, P.**, Klus, J., Képeš, E., Prochazka, D., Hahn, D. W. & **Kaiser, J.** (2018). On the utilization of principal component analysis in laser-induced breakdown spectroscopy data analysis, a review. *Spectrochimica Acta Part B: Atomic Spectroscopy*, 148, 65-82.

Pospíšilová, E., Novotný, K., **Pořízka, P.**, Hradil, D., Hradilova, J., **Kaiser, J.** & Kanický, V. (2018). Depth-resolved analysis of historical painting model samples by means of laser-induced breakdown spectroscopy and handheld X-ray fluorescence. *Spectrochimica Acta Part B: Atomic Spectroscopy*, 147, 100-108.

Prochazka, D., Zikmund, T., **Pořízka, P.**, Břínek, A., Klus, J., Šalplachta, J., ... & **Kaiser, J.** (2018). Joint utilization of double-pulse laser-induced breakdown spectroscopy and X-ray computed tomography for volumetric information of geological samples. *Journal of Analytical Atomic Spectrometry*, 33(11), 1993-1999.

Vrábel, J., **Pořízka, P.**, Klus, J., Prochazka, D., Novotný, J., Koutný, D., ... & **Kaiser, J.** (2018). Classification of materials for selective laser melting by laser-induced breakdown spectroscopy. *Chemical Papers*, 1-9.

Holá, M., Salajková, Z., Hrdlička, A., **Pořízka, P.**, Novotný, K., Čelko, L., ... & Kanický, V. (2018). Feasibility of Nanoparticle-Enhanced Laser Ablation Inductively Coupled Plasma Mass Spectrometry. *Analytical chemistry*, 90(20), 11820-11826.

Képeš, E., **Pořízka, P.**, Klus, J., Modlitbová, P. & **Kaiser, J.** (2018). Influence of baseline subtraction on laser-induced breakdown spectroscopic data. *Journal of Analytical Atomic Spectrometry*, 33(12), 2107-2115.

Prochazka, D., Mazura, M., Samek, O., Rebrošová, K., **Pořízka, P.**, Klus, J., ... & **Kaiser, J.** (2018). Combination of laser-induced breakdown spectroscopy and Raman spectroscopy for multivariate classification of bacteria. *Spectrochimica Acta Part B: Atomic Spectroscopy*, 139, 6-12.

Sládková, L., Prochazka, D., **Pořízka, P.**, Škarková, P., Remešová, M., Hrdlička, A., ... & **Kaiser, J.** (2017). Improvement of the Laser-Induced Breakdown Spectroscopy method sensitivity by the usage of combination of Ag-nanoparticles and vacuum conditions. *Spectrochimica Acta Part B: Atomic Spectroscopy*, 127, 48-55.

Škarková, P., Novotný, K., Lubal, P., Jebavá, A., **Pořízka, P.**, Klus, J., ... & **Kaiser, J.** (2017). 2d distribution mapping of quantum dots injected onto filtration paper by laser-induced breakdown spectroscopy. *Spectrochimica Acta Part B: Atomic Spectroscopy*, 131, 107-114.

Klus, J., **Pořízka, P.**, Prochazka, D., Mikysek, P., Novotný, J., Novotný, K., ... & **Kaiser, J.** (2017). Application of self-organizing maps to the study of U-Zr-Ti-Nb distribution in sandstone-hosted uranium ores. *Spectrochimica Acta Part B: Atomic Spectroscopy*, 131, 66-73.

**Pořízka, P.**, Klus, J., Mašek, J., Rajnoha, M., Prochazka, D., Modlitbová, P., ... & **Kaiser, J.** (2017). Multivariate classification of echellograms: a new perspective in Laser-Induced Breakdown Spectroscopy analysis. *Scientific reports*, 7(1), 3160.

Krajcarová, L., Novotný, K., Kummerová, M., Dubová, J., Gloser, V. & **Kaiser, J.** (2017). Mapping of the spatial distribution of silver nanoparticles in root tissues of *Vicia faba* by laser-induced breakdown spectroscopy (LIBS). *Talanta*, 173, 28-35.

**Pořízka, P.**, Klus, J., Hrdlička, A., Vrábel, J., Škarková, P., Prochazka, D., ... & **Kaiser, J.** (2017). Impact of laser-induced breakdown spectroscopy data normalization on multivariate classification accuracy. *Journal of Analytical Atomic Spectrometry*, 32(2), 277-288.