# INVITATION

## Department of Condensed Matter Physics

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# Oxide perovskite $ABO_3$ (A=Ca, Sr, Ba and B=V, Mo): from thin films growth towards transparent conducting electronics and for flexible electronics membranes

by

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| **Date:** | **16 April 2025** |
| **Time:** | **11:00** |
| **Venue:** | **Lecture room F1, Building 6, Faculty of Science, Kotlářská 2, Brno** |

Today's and tomorrow's information technologies require more integrated, compact and flexible electronics to meet the social demands of more and more data density and treatments, of easy portability and of lower energy consuming. In this perspective, complex transition-metal oxides, in particular $ABO_3$ perovskite oxides, are a promising and developing family of outstanding wide range of electronic and quantum properties including ferroelectricity, multiferroicity, metal-insulator transition, magnetism and superconductivity, naming only few [1]. In addition, their characteristic nanoscale coupling lengths and epitaxial integration structures have enabled the generation of new interfacial properties such as two dimensional (2D) metallic systems at $LaAlO_3/SrTiO_3$ interfaces and coupled properties in superlattice heterostructures [2].
We will focus on studies of the two families of transparent conducting oxides: the vanadates $AVO_3$ and the molybdates $AMoO_3$, describing their thin film growth by pulsed laser deposition (PLD) [2], their originality [4] and the tuning of their optical and transport properties [3]. And testing their material stability in ambient conditions, we discover their water solubility [4]. This ambivalence will impose certain technological restrictions for electronic integration. But its open also a new path for flexible electronics as a sacrificial layer to release self-supported membranes of functional oxide $ABO_3$ [5].

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MINISTRY OF EDUCATION, YOUTH AND SPORTS

In blue, GEMaC's group publications.

[1] Arthur P. Ramirez, Science 315 (2007) 1377; M. Bibes, M. and A. Barthélémy, « Oxide spintronics », IEEE Trans. Electron Devices 54 (2007) 1003; G. Rijnders Nat. Mater. 13 (2014) 844; Tokura *et al.,* Nature Phys 13, 1056–1068 (2017)
[2] A. Ohtomo, H. Hwang, Nature 427 (2004) 423; S. G. Jeong *et al.,* Adv Funct Materials 33 (2023) 2301770
[3] B. Bérini, *et al.,* Adv. Mater. Interfaces 3 (2016) 1600274 ; A. Fouchet et al., Mat. Science and Eng. B 212 (2016) 7
[4] L. Zhang *et al.*, Nature Materials 2016, 15, 2, 204-210 ; M. Mirjolet *et al.*, Adv. Funct. Mater. 2019, 04238
[3] A. Boileau *et al.*, Adv. Funct. Mater. 2022, 2108047 ; B. Berini *et al.*, Applied Surface Science 566 (2021) 150759
[4] Y. Bourlier, et al., ACS Appl. Mater. Interfaces 12 (2020) 8466 ; Y. Bourlier, et al., Applied Surface Science 553 (2021) 149536
[5] V. Polewczyk *et al.*, Adv. Mater. Interfaces 2025, 2500094; M. Mebarki et al., ACS Appl. Mater. Interfaces 2025, under revision

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