

INVITATION

Department of Condensed Matter Physics

Is pleased to invite you to the lecture

Europium-based topological semimetals
and magnetic semiconductors

by

dr. Mario Novak

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Date: 30 April 2025

Time: 11:00

Venue: Lecture room F1, Building 6, Faculty of Science, Kotlářská 2, Brno

In this seminar, I will discuss our recent work on Eu-based compounds, with a particular focus on EuCd_2As_2 , a material widely regarded as a topological semimetal in which a Weyl phase emerges under an external magnetic field. In our recent study published in *Phys. Rev. Lett.* 131, 186704 (2023), we challenge this prevailing view by presenting compelling experimental evidence obtained through a combination of electronic transport, optical spectroscopy, and excited-state photoemission spectroscopy. Our results demonstrate that EuCd_2As_2 is, in fact, a magnetic semiconductor with a gap of 0.77 eV—significantly different from predictions made by many *ab initio* calculations within the local spin-density approximation. In addition, I will present our recent magnetotransport measurements, which reveal colossal negative magnetoresistance and an anomalous Hall effect in insulating samples of EuCd_2As_2 , as well as other intriguing Eu-based compounds.

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