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# Physics Colloquium

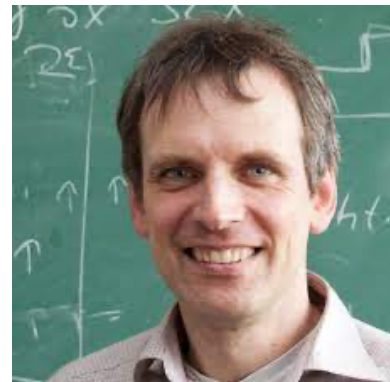
Tuesday, 25 April 2023 at 16:30

**Prof. Dr. Achim Rosch**

University of Cologne

## Emergent gauge fields in solids: from skyrmions to visons

The principle of gauge invariance is one of the most powerful concepts in physics. It is, for example, the basis of the standard model of particle physics. A fascinating question is where gauge theories may come from. Can they naturally "emerge" in the description of materials? We discuss how emergent electromagnetic fields [1] can arise from Berry phases and how they are used to describe the coupling of electrons to magnetic whirls, so-called magnetic skyrmion. Furthermore, we search for manifestations of emergent gauge excitations in liquid crystals and frustrated magnets approximately described by Kitaev models [2].



[1] T. Schulz, R. Ritz, A. Bauer, M. Halder, M. Wagner, C. Franz, C. Pfleiderer, K. Everschor, M. Garst, A. Rosch, Nature Physics 8, 301 (2012).

[2] Aprem P. Joy and Achim Rosch, Phys. Rev. X 12, 041004 (2022).

Venue: Universität Leipzig, Faculty of Physics and Earth Sciences  
04103 Leipzig, Linnéstraße 5, **Change of room: Small Lecture Hall**

Everyone is invited to **reception at 17:30** with snacks and drinks in the Aula after the lecture.

For an up-to-date semester program, sign-up for the physics colloquium mailing list, and subscription to the digital calendars in CalDAV format, head to the colloquiums web page [www.physgeo.uni-leipzig.de/events](http://www.physgeo.uni-leipzig.de/events).

