

PHYSICS COLLOQUIUM

Speaker: **Prof. Ulrich Kortz**
School of Science,
Constructor University,
Bremen



Topic: **From Polyoxotungstates to Polyoxopalladates: Synthesis, Structure and Magnetic Properties**

Time and place: Tuesday, January 7, 2025, **2:50 pm** – hybrid event
The colloquium will be held in REC/C213.

Online participation possible:

Zoom-Meeting: Meeting-ID: 631 3817 8900 / passcode: PC-WiSe24

<https://tu-dresden.zoom-x.de/j/63138178900?pwd=E3UjrdyVlnABCPExxEhG5XErr7Cv5B.1>

Host: Prof. Dmytro Inosov

Abstract: Polyoxometalates (POMs) are discrete, anionic metal-oxo clusters with a diverse compositional range, enormous structural variety, and a multitude of physicochemical properties including magnetism. Examples of classical POMs are the Keggin (e.g. $[\text{SiMo}_{12}\text{O}_{40}]^{4-}$) and Dawson ions (e.g. $[\text{P}_2\text{W}_{18}\text{O}_{62}]^{6-}$), but besides polyoxotungstates and -molybdates also polyoxovanadates, -niobates and -tantallates (e.g. $[\text{MV}_6\text{O}_{19}]^{8-}$, $\text{M} = \text{V}, \text{Nb}, \text{Ta}$) are known. A few POMs appear in nature as minerals (such as sherwoodite $\text{Ca}_{4.5}[\text{AlV}_{14}\text{O}_{40}]$), whereas the number of POMs synthesized in the laboratory is enormous. For the Keggin- and Dawson-type polyoxotungstates derivatives can be made by the incorporation of d or f block metal ions, including paramagnetic ones, and thereby engineering magnetic POMs. In fact, it was possible to incorporate up to 20 guest metal ions into the wheel-shaped POM host $\{\text{P}_8\text{W}_{48}\}$, resulting in $\{\text{Cu}_{20}\text{P}_8\text{W}_{48}\}$ and $\{\text{Fe}_{16}\text{P}_8\text{W}_{48}\}$. The spin-spin coupling of the oxo/hydroxo-bridged magnetic guest ions can be investigated, and in some cases molecular magnetism was observed (e.g. $\{\text{Co}_{16}\text{P}_8\text{W}_{36}\}$). In 2008 the class of polyoxopalladates(II) (POPs) was developed with the discovery of the cube-shaped $[\text{Pd}_{13}\text{As}_8\text{O}_{40}]_{14-}$, and then developed further systematically, resulting in different structure types such as star, open-shell, bowl, dumbbell, and some derivatives exhibited interesting magnetic properties.

Bio: 1983-1986: Study of Chemistry (B.Sc.), Giessen University, Germany / 1986-1989: Study of Chemical Engineering (M.Sc.), Darmstadt University, Germany (thesis title: Encapsulation of Biologically Active Substances in Polyelectrolyte Microparticles) / 1990-1995: Study of Chemistry (Ph.D.), Georgetown University, USA (thesis title: Diphosphate Complexes of Polyoxotungstates and Polyoxomolybdates) / 1995-1996: Postdoc, Università di Firenze, Italy / 1996-1997: Postdoc, Université de Versailles, France / 1997-2001: Assistant Professor, American University of Beirut

Mitglied von:



**DRESDEN
concept**
Exzellenz aus
Wissenschaft
und Kultur

(AUB), Lebanon / 2001-2002: Associate Professor, American University of Beirut, Lebanon / 2002-2007: Associate Professor, International University Bremen / (IUB)2007-: Professor, Jacobs University Bremen (formerly IUB).

Get-Together:

The colloquium will be followed directly by a Get-Together with Prof. Ulrich Kortz in REC/B101 (around 4:00 p.m.). All students and staff are invited to talk to the speaker and discuss perspectives on the academic career, work-life balance and the professional life as a scientist.