

UniCat Colloquium

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- Lecturer: **Prof. Pekka Pyykkö**, Professor (emeritus) at the University of Helsinki, Finland,
Chairman of the Societas Scientiarum Fennica - The Finnish Society of Sciences and Letters, Actual President of the International Academy of Quantum Molecular Science, Menton and Alexander-von-Humboldt Awardee
- Title: **Relativity and chemistry: From the yellow colour of gold to the lead-acid battery**
- Abstract: Relativistic effects on molecular electronic structure [1,2] can be treated by replacing the Schrödinger equation by the Dirac equation. They can also be qualitatively understood by simple order-of-magnitude arguments, now mentioned in most inorganic textbooks.
Some examples are the nobility, dominant trivalency and yellow colour of gold and probably the liquidity of mercury. A recent example is the lead-acid battery. Over 80 percent of its voltage come from relativistic effects. Cars start due to relativity [3].
The next physical level, quantum electrodynamics [4] will be much smaller, and may have been "the last train from physics to chemistry", at the level of fundamental interactions.
1. P. Pyykkö and J.-P. Desclaux, "Relativity and the periodic system of elements", *Acc. Chem. Res.* 12 (1979) 276.
 2. P. Pyykkö, "Relativistic effects in structural chemistry", *Chem. Rev.* 88 (1988) 563.
 3. R. Ahuja, A. Blomqvist, P. Larsson, P. Pyykkö and P. Zaleski-Ejgierd, "Relativity and the lead-acid battery", *Phys. Rev. Lett.* 106, 018301 (2011).
 4. P. Pyykkö, "The physics behind chemistry, and the Periodic Table", *Chem. Rev.* (submitted).
- Date: **Wednesday, 25 May 2011**
- Time: **5:15 pm - around 6:45 pm**
- Location: **TU Berlin, Institute of Chemistry,
Straße des 17. Juni 115, 10623 Berlin
Building C, Lecture Hall C 243**
- Organiser: **Prof. Martin Kaupp (TUB)**

Coffee and tea will be served thirty minutes prior to the lecture start.
Guests are cordially invited to attend!

Prof. Dr. Matthias Driess, Chair of the Cluster of Excellence UniCat