

# SEMINARIUM RENTGENOWSKIE

Dnia 19.01.2016r. o godz. 10.30, w sali D Instytutu Fizyki PAN, odbędzie się seminarium rtg., na którym **dr. Damian Paliwoda** z European Synchrotron Radiation Facility (Grenoble, France) wygłosi referat, przygotowany w ramach projektu EAgLE, na temat:

## "High Pressure Physics and Chemistry at the European Synchrotron Radiation Facility"

### Streszczenie:

Like temperature, pressure can be considered as an effective tool for tuning crystal structure by changing energetic hierarchy of non-bonding forces. Pressure can induce phase transitions and structural changes leading to new molecular arrangements of varied physical properties, such as crystal polarity, magnetic and/or optical properties.

The last several decades have shown that unexpected physical and structural behaviour at high and ultra-high pressures is the rule rather than the exception.

The presentation will be divided into two parts. In the first part a short introduction and history of high-pressure research will be presented. This part includes the breakthrough invention of a diamond anvil cell, its design and implementation in high-pressure diffraction experiments at laboratories and large synchrotron facilities. A short description of High Pressure Station ID09A will be given.

Several examples of pressure-induced transformations are going to be discussed in the second part of a contribution. They will include pressure effects on simple elements like lithium [1] or oxygen, [2] phase transitions in molecular crystals (e.g. in ferrocene [3]), spin-crossover effects in iron compounds [4] and high-pressure synthesis of new stoichiometries of sodium chloride. [5].

### References:

1. Hanfland, M., Syassen, K., Christensen, N. E., Novikov, D. L., *Nature*, 2000, **408**, 174-178.
2. Lundegaard, L. F., Weck, G., McMahon, M. I., Desgreniers, S., Loubeyre, P., *Nature*, 2006, **443**, 201-204.
3. Paliwoda, D., Kowalska, K., Hanfland, M., Katrusiak, A., *J. Phys. Chem. Lett.*, 2013, **9**, 4034-4039.
4. Ju, S., Cai, T.-Y., Lu H.-S., Gong, C.-D., *J. Am. Chem. Soc.*, 2012, **134**, 13780–13786.
5. Zhang, W., Oganov A. R., Goncharov, A. F., Zhu, Q, Boulfelfel S. E., Lyakhov, A. O., Stavrou, E., Somayazulu, M., Prakapenka, V. B., Konopková Z., *Science*, 2013, **342**, 1502-1505.

Prof. dr hab. Krystyna Jabłońska  
Prof. dr hab. Wojciech Paszkowicz