

# **SEMINAR ON MAGNETISM AND SUPERCONDUCTIVITY**

We kindly inform You that on **Wednesday**

**March 29<sup>th</sup> at 10:00**

there will be an **on-line seminar (link is provided on the IP PAS website),**

where

**prof. dr hab. Karol Izydor Wysokiński**

*(Maria Curie-Skłodowska University, Lublin)*

will deliver a lecture on:

## **“Charge and heat transport through a quantum dot: two novel aspects”**

Nanostructures with quantum dots are still an active area of experimental and theoretical research. In the talk I shall discuss charge and heat transport through an interacting quantum dot in two situations of interest.

In the first case we address the following question: if the local interactions between electrons on the quantum dot are important, one should also observe an effect of the so called “correlated” hopping meaning that the probability amplitude for the tunneling of a spin  $\sigma$  electron onto the dot should depend on the presence of an electron with opposite spin ( $-\sigma$ ). We look at the influence of the “correlated hopping” on various transport characteristics in the two terminal device.

The second case of interest is the observation that in the four terminal nanostructure in a cross geometry the currents may flow along the biased electrodes or perpendicular to them. We are interested in the rectification properties in such a geometry. By rectification we mean here the difference between the currents with forward and reversed bias. To observe the rectification, one must break two mirror symmetries of the device in the linear regime, whereas breaking a single mirror symmetry is enough in the regime of nonlinear transport.

**We sincerely invite You**

**Roman Puźniak  
Andrzej Szewczyk  
Henryk Szymczak**