

# **SEMINAR ON MAGNETISM AND SUPERCONDUCTIVITY**

We kindly inform You that on **Wednesday**

**May 31<sup>st</sup> at 10:00**

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

where

**MSc. Sameh Altanany**

*(Institute of Physics PAS, Warsaw)*

will deliver a lecture on:

## **“Vortex dynamics in ultra-thin Nb superconducting films”**

The physics of vortex matter in disordered two-dimensional niobium (Nb) films with different thickness is studied by using the temperature-dependent resistance and the current–voltage (IV) characteristics in perpendicularly applied magnetic fields.

In the absence of external magnetic field inhomogeneity of the material strongly affects the transition to superconducting state upon the decrease of the temperature, leading to broadening of the transition, and eventually destroying the zero resistance state. The magnetic field introduces vortices in the mixed state.

The phase diagram of vortex matter under the influence of external magnetic field, the temperature, the driving transport currents, and intrinsic material inhomogeneity determines the possible useful applications of superconductors. However, many features of this phase diagram are not yet well understood. Here we discuss several of these features, which we observe in thin inhomogeneous Nb films, including vortex glass transition, vortex creep behavior in the presence of strong pinning centers and low driving currents, and the possible development of phase slip lines at high current densities. Comparison with theories suggests that transition to vortex glass is not universal, most likely due to creep behavior.

**The lecture will be delivered in English.**

**We sincerely invite You**

**Roman Puźniak  
Andrzej Szewczyk  
Henryk Szymczak**