

## **SEMINARIUM Z MAGNETYZMU I NADPRZEWODNICTWA**

Uprzejmie zawiadamiamy, że w **środę**

**01 czerwca 2022 r., o godz.10:00**

odbędzie się seminarium **on-line** (link podany jest na stronie IF PAN),  
na którym

**mgr Sameh Altanany**

*(Instytut Fizyki PAN, Warszawa)*

wygłosi referat na temat:

### **“ Berezinski-Kostelitz-Thouless transition in ultrathin niobium films”**

The transition to the superconducting (SC) state in 2 dimensional (2D) films is believed to be described by Berezinski-Kostelitz-Thouless (BKT) theoretical model, which assumes that the thermal unbinding of the vortex-antivortex pairs occurs at certain temperature,  $T_{\text{BKT}}$ , leading to the specific evolution the nonlinear exponent of the current-voltage (I-V) characteristics. However, many recent studies suggest that this description is restricted to the case of homogeneous films. Since this films are prone to various types of disorder, which may lead to inhomogeneity, it is important to understand how disorder modifies the I-V behavior, so that the description in terms of the BKT model becomes invalid.

Here we study the influence of disorder on the superconducting (SC) transition in ultrathin niobium (Nb) films of various thickness, ranging from 2.5 nm up to 10 nm, in the absence of external magnetic field. The films are sandwiched between two thin silicon layers for protection against oxidation. In thick films we observe the behavior predicted by the BKT model, including well-defined jump in the superfluid density at the  $T_{\text{BKT}}$ . However, with the decrease of film thickness the behavior evolves, so that in thinnest film no  $T_{\text{BKT}}$  may be identified, suggesting breakdown of the film into SC islands, immersed in the metallic, non-SC background.

**Serdecznie zapraszamy**

**Roman Puźniak  
Andrzej Szewczyk  
Henryk Szymczak**