

# **SEMINAR ON MAGNETISM AND SUPERCONDUCTIVITY**

We kindly inform You that on **Wednesday**

**March 19<sup>th</sup> at 10:00**

there will be a **seminar in room 203, building I,**

where

**Prof. Dr. Roman Puźniak**

*(Institute of Physics of the Polish Academy of Sciences, Warsaw, Poland)*

will deliver a lecture on:

**“Crystallinity degradation due to chemical substitutions, applied pressure, and hydrogenation as a driving force for enhancement of superconducting state properties in Fe-Te-Se single crystals”**

It has been already shown that the almost ideal single crystal of  $\text{FeTe}_{0.65}\text{Se}_{0.35}$  exhibits a greater width of superconducting transition and a considerably smaller value of the critical current density in comparison with non-uniform sample of the same compound. Resistivity results confirmed that the inhomogeneous spatial distribution of ions and presence of small hexagonal-like phase in chalcogenides with nanoscale phase separation seem to enhance the superconductivity in this system. Under ambient pressure the weakening of superconducting state properties was observed in  $\text{Fe}_{0.994}\text{Ni}_{0.007}\text{Te}_{0.66}\text{Se}_{0.34}$  crystal, with disorder introduced by Ni substitution, as compared with those in  $\text{Fe}_{0.99}\text{Te}_{0.66}\text{Se}_{0.34}$ . For  $\text{Fe}_{0.994}\text{Ni}_{0.007}\text{Te}_{0.66}\text{Se}_{0.34}$ , the x-ray diffraction studies have revealed a degradation of crystal quality under applied elevated pressure. Comprehensive studies of impact of pressure on crystal structure and on superconducting state properties confirmed that enhancement of superconductivity under pressure correlates with appearance of mosaicity. It was shown that thermal diffusion of hydrogen into the crystals causes significant structural changes, leads to degeneration of crystal quality, and significantly alters superconducting properties, especially enhances the critical current density.

**The lecture will be in Polish on-site in room 203, the slides will be in English.**

**ZOOM transmission will be available too - link is provided on the IP PAS website.**

**We sincerely invite You**

**Roman Puźniak / Andrzej Szewczyk / Henryk Szymczak**