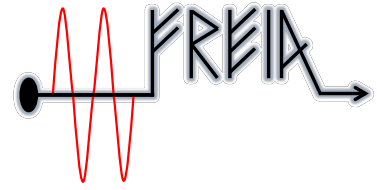# Special International seminar from 16:00 on December 1st
by **Dr. František Herman** from Comenius University

Dynes superconductors theory cornerstones and the effect of disorder in real-life samples experiments

The recent development of the Dynes superconductor theory shows to nicely describe properties of the coherence peak measured in the temperature dependence of the optical conductivity in samples used in superconducting Niobium cavities [1]. The theory of the Dynes superconductor was developed to take into account pair-conserving and pair-breaking scattering processes [2] in general and not perturbative manner. In this way, it is well suited towards the use in real-life material samples. I will start with a short introduction to the used methods creating building blocks of the Dynes superconductor framework. These are the Green function approach and Coherent Potential Approximation in the superconductive state. After this introduction (~15 min), I would like to focus more on their electromagnetic properties [3] and implications mainly towards the superconductive cavities (~20 min). In the end, I would like to introduce further development (together with some preliminary results) which goes beyond the Dynes paradigm using spectral functions properties for general low-temperature superconductors [4] (which can be measured by ARPES) (~5 min).

If there shows to be a possibility, I would like to discuss with experts e.g. about disorder effects in odd frequency superconducting Cooper pairs at the end [5]. However, firstly I would need to know the characteristic frequency (or energy scale) for their appearance in the experiment.

References
[1] F. H. and Richard Hlubina, PRB **104**, 094519 (2021)
[2] F. H. and Richard Hlubina, PRB **94**, 144508 (2016)
[3] F. H. and Richard Hlubina, PRB **96**, 014509 (2017)
[4] F. H. and Richard Hlubina, PRB **95**, 094514 (2017)
[5] Jorge Cayao, Christopher Triola, and Annica M. Black-Schaffer, PRB **103**, 104505 (2021)

Zoom link:
https://uu-se.zoom.us/j/68422673400

meeting ID: 684 2267 3400
pass code: 898953