

Mathematical Colloquia

Monday, 30 September 2024

17:15 h, lecture room B6 (ExWi)

Prof. Dr. Joao Ramos, EPFL

Beyond Heisenberg: modern perspectives on Fourier uncertainty

Abstract : The classical Heisenberg uncertainty principle establishes a fundamental limit on the simultaneous localization of a function in both space and frequency, with far-reaching implications in signal processing, quantum physics, and information theory. While this classical result remains as important as ever, recent breakthroughs show that the Heisenberg estimate is only the beginning.

In this talk, we shall use the classical uncertainty framework as a platform to explore recent developments in the field, including but not limited to Viazovska's breakthrough solution to the sphere-packing problem in dimensions 8 and 24 and its connections to uncertainty principles and the emerging theory of discrete Fourier uniqueness pairs, with a view towards new challenges in the field.