

January 29; 4pm; Rm 118 Nieuwland



The Quantum Sounds of Fermi Fluids

Dr. Inti Sodemann Villadiego

Max Planck Institute for the Physics of Complex Systems

Ordinary classical fluids have a single type of sound waves consisting of longitudinal compressional oscillations of the density. Solids, on the other hand, have also transverse or shear sound waves because of their non-zero restoring force to shear deformations. In this talk, I will illustrate that quantum fermi liquids can radically deviate from this paradigm by developing a sharp collective transverse or shear sound wave when their interactions increase beyond a threshold, even though their ground state remains in a liquid state without any form of proper static crystalline order. I will explain why these shear waves have eluded observation to this date and describe specific signatures that could finally allow their conclusive experimental detection. I will also try to describe how this strange behaviour fits within the broader context of our island of knowledge of quantum interacting gapless phases of matter and the vast ocean of mystery surrounding this island.