Julius-Maximilians-
UNIVERSITÄT
WÜRZBURG

MUΦX
Lehrstuhl

Announcement

Seminar on Deformation Quantization and Geometry

17. 10. 2025 at 14:00 s.t.

Seminarroom SE 31

Matthias Schötz (JMU Würzburg)

How undecidable is the spectral gap problem?

A famous result by Cubitt, Perez-Garcia, and Wolf states that the spectral gap problem is undecidable in general. In this talk I will discuss how the spectral gap problem appears in quantum many body physics and in what sense it is undecidable, and in what sense it perhaps is not: It turns out that different communities have different spectral gap problems, which are related (at least heuristically) but ultimately inequivalent. For computablility-related questions, these details actually do matter – in one setting it might be impossible to device an algorithm that will certify the absence of a spectral gap greater or equal 1, while in a different setting one can give an algorithm that produces a decreasing sequence of real numbers that converges against the spectral gap. These positive results are work-in-progress together with the PhIQuS-group of Inria Saclay, France.

Invited by Stefan Waldmann