Micro-Symposium: Dynamical Systems and Spectral Theory

21–22 February 2022

Faculty of Mathematics

Bielefeld University

Lecture Room: V2-213

Organiser: Michael Baake

`www.math.uni-bielefeld.de/baake/iaper/`

Micro-Symposium: Dynamical Systems and Spectral Theory

Schedule: Monday, February 21th, 2022

Lecture Room: **V2-213**

10:30	–	11:00	**Welcome and opening**
11:00	–	12:00	**Timo Spindeler** (Bielefeld University) A characterisation of pure point spectra via mean almost periodicity
12:30	–	14:00	Lunch (Mensa)
14:30	–	15:30	**Michael Coons** (Bielefeld University) The spectral purity of ghost measures
15:30	–	16:00	Coffee break
16:00	–	17:00	**Asgar Jamneshan** (Koç University) On some aspects of the relation between size and additive structure
17:45			Dinner at Univarza

Schedule: Tuesday, February 22th, 2022

Lecture Room: **V2-213**

10:00	–	11:00	**David Damanik** (Rice University) Gap Labelling: What is it and why is it useful?
11:00	–	12:30	**Individual discussions**
12:30			Lunch (Mensa)

Abstracts

Michael Coons (University of Newcastle, Australia and Bielefeld University)

The spectral purity of ghost measures

We discuss the conditions under which ghost measures are spectrally pure. In addition, we will determine the spectral type based on properties of the underlying finite set of matrices.

David Damanik (Rice University)

Gap Labelling: What is it and why is it useful?

We give an introduction to the gap labelling theorem, due to Bellissard et al. Gap labelling involves the identification of a set of natural labels of spectral gaps of dynamically defined operators that only depends on the base dynamics and is uniform in the sampling function. In the special case of one-dimensional Schrödinger operators we present Johnson's approach to this result, which is based on the Schwartzman homomorphism. If time permits, some recent applications of gap labelling, both in terms of the presence and the absence of spectral gaps, will be discussed.

Asgar Jamneshan (Koç University)

On some aspects of the relation between size and additive structure

The catch of Szemeredi's theorem is that arithmetic structure is indestructible: If a set of integers is large enough, then it must contain arithmetic structure. Szemeredi's theorem has found various proofs. In this talk, I will give a high-level presentation of two of its influential proofs, the dynamical proof of Furstenberg and the Fourier analytic proof of Gowers; focusing on some structural and conceptual analogies between these two approaches. Then I will report on recent progress towards a unification. This talk is partially based on joint works with Terence Tao and Or Shalom. It is intended to be self-contained and accessible to anyone with a general graduate-level mathematical background.

Timo Spindeler (Bielefeld University)

A characterisation of pure point spectra via mean almost periodicity

Systems with pure point spectra are of special interest in different branches of mathematics. The objective of this talk is to introduce the notion of mean almost periodicity, and explain how it can be used to characterise sytems with pure point diffraction/dynamical spectrum.