SHORT TALKS

Konrad Aguilar, Pomona College,
The Podleś spheres converge to the sphere

The Podleś spheres $(S^2_q)_{q\in(0,1]}$ form a deformation of the 2-sphere, where the 2-sphere is recovered when $q = 1$. In this talk, we will show that the S^2_q converge to $C(S^2)$ in Rieffel's quantum Gromov-Hausdorff distance as q tends to 1. This is accomplished by using a quantum metric on each S^2_q arising from a natural spectral triple on S^2_q that has been introduced and studied by many. We will also provide a brief introduction to quantum metric spaces and the quantum Gromov-Hausdorff distance. This is joint work with Jens Kaad and David Kyed.

Becky Armstrong, WWU Münster,
A uniqueness theorem for twisted groupoid C*-algebras

Twisted groupoid C*-algebras were introduced by Renault in 1980 and are a generalisation of twisted group C*-algebras, which are the C*-algebraic analogue of twisted group rings. Through the work of Renault and more recently of Li, it has emerged that every simple classifiable C*-algebra can be realised as a twisted groupoid C*-algebra, a result that has led to increased interest in the structure of these C*-algebras. In this talk I will describe the construction of reduced twisted C*-algebras of Hausdorff étale groupoids. I will then discuss my recent preprint in which I prove a uniqueness theorem for these algebras and use this to characterise simplicity in the case where the groupoid is effective.

Johannes Christensen, KU Leuven,
KMS spectra for group actions on compact spaces.

For an action of a countable group by homeomorphisms on a compact space one can associate the crossed product C*-algebra, which encodes information about the group action. The crossed product construction is a cornerstone in the theory of C*-algebras and has stimulated a mutually beneficial interplay between dynamical systems and operator algebras. In this talk I will uncover a surprising relation between geometric group theoretic properties of a group G and the so called *KMS spectra* for certain diagonal 1-parameter groups on the crossed product C*-algebras of actions of G.

I will present results which illustrates that the possible KMS spectra depend heavily on the acting group G: when G has subexponential growth, only the subsets $\{0\}$, $[0, +\infty)$, $(-\infty, 0]$ and $\mathbb{R}$ arise as KMS spectrum; for general amenable groups all closed subsets of $\mathbb{R}$ containing zero can arise and are concretely realized for certain wreath product groups; while for arbitrary countable groups, any closed subset of $\mathbb{R}$ may appear and is concretely realized for the free group with infinitely many generators.

The results I will present in this talk are joint work with Stefaan Vaes.

Kristin Courtney, WWU Münster,
Nuclearity and generalized inductive limits

One of Alain Connes' seminal results establishes that any von Neumann algebra which can be well-approximated by finite dimensional von Neumann algebras (i.e., is semi-discrete) can actually be built from them via a direct limit construction (i.e., is hyperfinite). A direct C*-analogue to this theorem is impossible– most nuclear C*-algebras are not AF. To describe all nuclear C*-algebras as direct limits of finite dimensional C*-algebras, we must generalize our notion of inductive systems. Great strides in this direction were taken by Blackadar and Kirchberg, who were able to characterize quasidiagonal nuclear C*-algebras as those arising as (generalized) inductive limits of finite dimensional C*-algebras. In joint work with Wilhelm Winter, we further generalize this construction to give a complete characterization of separable nuclear C*-algebras as those arising from a (generalized) inductive limit of finite dimensional C*-algebras.

Marzieh Forough, Czech academy of sciences,
Lifts of completely positive maps

Let A and B be C^*-algebras, with A being separable, and let I be an ideal in B. I first discuss that for any completely positive contractive linear map $\varphi\colon A \to B/I$ there exists a continuous family $\Theta_t\colon A \to B$, for $t \in [1, \infty)$, of lifts of φ that are asymptotically linear, asymptotically completely positive and asymptotically contractive. Then I show that if A and B are equipped with continuous actions of a second countable locally compact group G such that I is G-invariant and φ is equivariant, the family Θ_t can be chosen to be asymptotically equivariant. Moreover, if φ admits a linear completely positive lift, then we can choose θ_t to be linear and completely positive, for any $t \in [1, \infty)$. The latter result implies an equivariant generalization of the Choi-Effros lifting theorem.

This talk is based on joint work with Eusebio Gardella and Klaus Thomsen.

Eusebio Gardella, WWU Münster,
Amenable actions of hyperbolic groups and classifiability of crossed products.

We show that every amenable, minimal and topologically free action of a hyperbolic group on a compact Hausdorff space X is paradoxical. In particular, this implies that the crossed product is a Kirchberg algebra satisfying the UCT, regardless of the dimension of the space X. We accomplish this by studying the canonical action on the Gromov boundary and establishing a strong form of paradoxicality for it.

This is joint work with Shirly Geffen, Julian Kranz, and Petr Naryshkin.

Alon Dogon, Hebrew University,
On uniform Hilbert Schmidt stability of groups.

Consider the following question: Given a group G, and a map φ from G to some unitary group U(n). Knowing that φ is close to being a homomorphism (i.e. unitary representation), can we find a true unitary representation that is close to it? This question depends a lot on how one measures distances of matrices in U(n). D. Kazhdan proved the answer is affirmative when G is amenable and the operator norm is used to measure distances. In a joint work with Danil Akhtiamov, we consider the question when using the normalized Hilbert Schmidt norm on U(n), and give a characterisation of residually finite, finitely generated groups that satisfy this property. We will demonstrate how Operator Algebraic techniques enter the picture.

Sophie Emma Mikkelsen, Southern Denmark University,
KK-equivalence for quantum projective spaces

In this talk we present an explicit KK-equivalence between the noncommutative C^*-algebra of continuous functions on the quantum complex projective space $C(\mathbb{C}P_q^n)$ and the commutative algebra $\mathbb{C}^{n+1}$. The construction relies on showing that the short exact sequence of C^*-algebras $\mathcal{K} \to C(\mathbb{C}P_q^n) \to C(\mathbb{C}P_q^{n-1})$ is split exact for all n. In the construction of a splitting it is crucial that $C(\mathbb{C}P_q^n)$ can be described as a graph C^*-algebra due to Hong and Szymański. This talk is based on joint work with Francesca Arici.

Sergio Giron Pacheco, University of Oxford,
Anomalous symmetries of simple operator algebras

In this talk I will start by giving an elementary introduction to the symmetries of the Hyperfinite II_1 factor R. I will briefly discuss classification results of these by Connes, Jones, Ocneanu and Popa. I will then discuss how the existence of these symmetries carry over to a particularly nice class of C*-algebras, those classified by the Elliott programme. It is known that any countable discrete group G acts faithfully on any classifiable C*-algebra. However, even for types of quantum symmetries closely related to group actions, anomalous symmetries, the existence question is a subtle one. I will discuss some example constructions of anomalous symmetries and also K-theoretic obstructions to the existence of these symmetries. This talk is based on joint work with Samuel Evington.

Guy Salomon, Weizmann Institute,
When can a discrete group be decomposed into completely syndetic sets?

A subset A of a discrete group G is called completely syndetic if for every positive integer n there are finitely many left translates of A such that every n elements of G belong together to at least one of these translates.

In this talk, I will discuss the question in the title and present some relations to certain C*-algebras, Boolean algebras and dynamical systems. In particular, I will explain how to construct nontrivial minimal proximal actions for non strongly amenable groups. I will also show how this machinery helps to characterize "dense orbit sets" answering a question of Glasner, Tsankov, Weiss and Zucker.

The talk is based on a joint work with Matthew Kennedy and Sven Raum and an ongoing work with Ariel Yadin.