

Department of Mathematics, BGU

Operator Algebras and Operator Theory

On Monday, February 12, 2024

At 14:00 – 15:00

In 201

Ilan Hirshberg (BGU)

will talk about

Non-isomorphic simple AH algebras with the same Elliott invariant and same radius of comparison

Abstract: The talk will be aimed at an audience which is not necessarily familiar with the concepts below, and I'll aim to explain them at the expense of providing proofs. The Elliott classification program for simple nuclear C -algebras reached an important milestone in the past decade. This program aims to classify simple separable nuclear C -algebras in terms of the Elliott invariant, consisting of the K -theory groups and tracial data. It is now established that such C -algebras can be classified provided they are Z -stable (a key regularity condition) and satisfy the Rosenberg-Schochet Universal Coefficient Theorem (where it is a major open problem to determine whether this theorem holds for all simple nuclear separable C -algebras). The classification theorem was shown not to extend beyond the

Z-stable case. Specifically, Toms constructed examples of simple separable nuclear unital C^* -algebras with the same Elliott invariant, but which can be distinguished by another invariant he called the radius of comparison, which measures to what extent positive elements fail to be compared via tracial data. While there were good reasons to think that simply adding the radius of comparison to the invariant would not be sufficient to extend the classification theorem further, intriguingly, recently, Elliott, Li and Niu proved a classification theorem for so-called Villadsen-type algebras using the combination of the Elliott invariant and the radius of comparison, an invariant which was introduced by Toms in order to distinguish between certain non-isomorphic AH algebras with the same Elliott invariant. This might have raised the prospect that the Elliott classification program can be extended beyond the Z-stable case by adding the radius of comparison to the invariant. I will discuss a recent preprint in which we show that this is not the case: we construct an uncountable family of non-isomorphic AH algebras with the same Elliott and same radius of comparison. We can distinguish between them using a finer invariant, which we call the local radius of comparison. This is joint work with N. Christopher Phillips.