

KMS spectra for group actions on compact spaces

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The crossed product construction associates a C^* -algebra to a countable group acting by homeomorphisms on a compact space, in such a way that the C^* -algebra encodes information about the group action. This construction 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 . The KMS spectrum for a 1-parameter group is the set of inverse temperatures for which there exists a *KMS state*, a concept originally studied in relation to quantum statistical mechanics, and that now plays a prominent role in the theory of C^* -algebras.

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.