COHOMOLOGY OF 1D TILINGS AND THE SEMI-PROPER CONDITION

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A long-established process associates a cohomology, or K-theory group to any one dimensional aperiodic, repetitive tiling, and this group carries various geometric and dynamical information. However, its calculation is by no means straightforward and over the years, through a variety of authors, approaches have been developed for efficient computing. One of the most efficient, perhaps the most efficient in the case of a substitution tiling, is that of re-writing the substitution as a so-called semi-proper one. This is (mostly) explicit in the 2008 paper of Durand, Host and Skau, and was implemented by Balchin and Rust in their free access Grout program for performing cohomology computations.

In this talk, after introducing the basic landscape, I want to develop the notion of a semi-proper resolution for any aperiodic, repetitive tiling (including the substitutions and S-adics), and explain why it does indeed compute cohomology correctly—but why it only just works, even for substitutions. This is part of joint work with Alex Clark.