COLLOQUIUM

TITLE: Multiple mixing and short polynomials.

ABSTRACT: In dynamical systems the notion of multiple mixing seems to strengthen that of mixing for an action on a probability space. Whether it actually does is a long-standing open question. After Ledrappier's unexpected 1978 confirmation for two commuting actions the theory for general compact abelian groups has been studied, and several problems have been posed by Klaus Schmidt. In this context the speaker in 2004 proved that when multiple mixing fails it does so in an orderly fashion thanks to the so-called "non-mixing sets", and in 2006 with Harm Derksen that the size of the smallest such set could be effectively determined. Last year we gave a finiteness result for these smallest sets. It is closely related to the problem of finding all "shortest" elements of a given ideal in a polynomial ring. To display the effectivity we tested a simple ideal in $\mathbf{F}_2[x, y, z]$; it turned out to have 137 shortest elements *modulo* a natural equivalence relation.