1163-03-683 **Gabriel Conant***, University of Cambridge, Centre for Mathematical Sciences, Cambridge, CB3 0WB, United Kingdom. *Model theoretic tameness in multiplicative combinatorics.*

In combinatorics, an "inverse theorem" is a result in which mathematical objects exhibiting approximate structure are proved to be close to objects that are perfectly structured. A celebrated example is the structure theorem for approximate subgroups due to Breuillard, Green, and Tao, which built on work of Hrushovski.

This talk is about related results in the context of model-theoretic tameness. For example, Martin-Pizarro, Palacín, and Wolf showed that under a local stability assumption, a finite approximate subgroup can be approximated by a bounded number of cosets of a finite subgroup, up to error $\epsilon > 0$. Their proof combines local stability theory with the stable arithmetic regularity lemma for finite groups due to C., Pillay, and Terry, but gives ineffective bounds. I will first discuss a new proof of this result, which yields polynomial bounds in $1/\epsilon$. This also provides the first quantitative account of stable arithmetic regularity for arbitrary finite groups, and improves the previous exponential bound in the abelian case (due to Terry and Wolf). I will then describe joint work with Pillay on analogous qualitative results in the setting of bounded VC-dimension, which is motivated by previous work on NIP arithmetic regularity. (Received September 11, 2020)