

December 7th, 2020

Peter Patzt

University of Oklahoma /
at present Copenhagen University

High cohomology of arithmetic groups

Abstract: This will be an overview talk about recent developments on the high dimensional cohomology of the special linear groups of number rings and its congruence subgroups. All of these arithmetic groups have a finite virtual cohomological dimension (vcd) which implies that their rational cohomology above the vcd vanishes. The rational cohomology in and close to the vcd is not very well studied yet but of great interest in algebraic K -theory and algebraic number theory. For example Church-Farb-Putman conjecture that $H^{vcd-i}(SL_n Z; Q)$ vanishes for n sufficiently large in comparison to i . Proving this conjecture will likely show that the algebraic K -group $K_{12}(Z) = 0$.

Borel-Serre duality connects high dimensional cohomology of these arithmetic groups with low dimensional homology with Steinberg coefficients. In this talk, we will introduce all of these concepts and give an overview what this tells us about the high dimensional cohomology of the special linear groups of number rings and the high dimensional cohomology of prime level principal congruence subgroups of $SL_n Z$.