Yuri Zarhin (Penn State). Finite linear groups, invariant lattices and elliptic curves.

Abstract. Let $V$ be a finite-dimensional complex vector space and let $G$ be an irreducible finite subgroup of $GL(V)$. For a $G$-invariant lattice $L$ in $V$ of maximal rank, we study the complex torus $V/L$. It turns out that for a wide class of groups, $V/L$ is isogenous to a self-product of an elliptic curve, and in many cases $V/L$ is even isomorphic to a product of mutually isogenous elliptic curves $X$ with non-trivial endomorphisms (complex multiplication). On the other hand, there are $G$ and $L$ such that the complex torus $V/L$ is *not* an abelian variety (i.e., it could *not* be embedded into the complex projective space of any dimension) but one can always replace $L$ by another $G$-invariant lattice $D$ such that $V/D$ is a product of elliptic curves with complex multiplication.

This is a joint work with Vladimir Popov (Steklov Inst., Moscow).