1125-11-2249 **Nathan Kaplan*** (nckaplan@math.uci.edu), **Gautam Chinta** (gchinta@ccny.cuny.edu) and **Shaked Koplewitz** (shaked.koplewitz@yale.edu). *Counting lattices by cotype.*

The short integer solution (SIS) problem asks, given m uniformly random elements $g_1, \dots, g_m$ from $(\mathbb{Z}/q\mathbb{Z})^n$ to find an integer vector $(x_1, \dots, x_m)$ of small norm such that $x_1 g_1 + \cdots + x_m g_m = 0$. This problem plays an important role in the theory of worst-case to average-case reductions for lattice problems developed by Ajtai. This naturally leads to finding short vectors in sublattices L of $\mathbb{Z}^m$ with $\mathbb{Z}^m/L = (\mathbb{Z}/q\mathbb{Z})^n$. In the generalized version of this problem we replace $(\mathbb{Z}/q\mathbb{Z})^n$ with a more general finite abelian group G.

The cotype of an n-dimensional lattice L is the finite abelian group $\mathbb{Z}^n/L$. What properties do we expect for the cotype of a randomly chosen sublattice of $\mathbb{Z}^n$? How many sublattices have cotype G? We discuss these and other problems and explain a connection to the Cohen-Lenstra heuristics from number theory. (Received September 20, 2016)