1050-05-79   **David Feldman** and **James Propp*** (`JamesPropp@gmail.com`), Department of Mathematical Sciences, University of Massachusetts Lowell, One University Avenue, Lowell, MA 01854, and **Sinai Robins**. *Tiling lattices with translates of sublattices.* Preliminary report.

We study the problem of tiling (exactly covering) an n-dimensional lattice by finitely many translates of sublattices. If we make the assumption that each tiling sublattice is a Cartesian product of arithmetic progressions, we can use Fourier methods to prove that two of the sublattices must be translates of one another. In the absence of this assumption, it can happen (for $n > 2$) that no two of the sublattices are translates of one another. The case $n = 2$ remains open, and we are exploring the use of theta functions to illuminate the question. (Received March 04, 2009)