Abstract: It is well known that if a finite set of integers $A$ tiles the integers by translations, then the translation set must be periodic, so that the tiling is equivalent to a factorization $A + B = \mathbb{Z}_M$ of a finite cyclic group. Coven and Meyerowitz (1998) proved that when the tiling period $M$ has at most two distinct prime factors, each of the sets $A$ and $B$ can be replaced by a highly ordered ”standard” tiling complement. It is not known whether this behaviour persists for all tilings with no restrictions on the number of prime factors of $M$.

In joint work with Itay Londner, we proved that this is true when $M = (pqr)^2$ is odd. (The even case is almost finished as well.) In my talk I will discuss this problem and introduce the main ingredients of the proof.