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**Chaim Goodman-Strauss\*** (cgstraus@comp.uark.edu), Dept. Mathematics, Univ. Arkansas, Fayetteville, AR 72701. *Aperiodicity and Computation in the Hyperbolic Plane.*

About twenty-five years ago, R. Robinson asked if the “Domino Problem” is undecidable in the hyperbolic plane; that is, whether there is not an algorithm to decide whether any given set of tiles admits a tiling of  $H^2$ . Around the same time, the first examples of “weakly aperiodic protosets” were given in the hyperbolic plane. Such protosets admit tilings, but admit no tilings with compact fundamental domain. Many examples later, we see that somehow these are missing something; it is thus natural to ask whether there exist “strongly aperiodic protosets”, protosets that admit tilings but admit no tiling with even an infinite cyclic symmetry. These questions all turn out to be linked logically, but also thematically: they can be paraphrased as asking “just how complex can the simplest permitted behaviour of a given protoset be”. After all this time, it seemed fair to conjecture, counter-intuitively, “not very”. All strategies for proving the Domino Problem undecidable in  $H^2$  had failed, and no strongly aperiodic protoset had been found. We report on very recent progress, settling some of these issues. (Received October 02, 2000)