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*Approximate Subgroups, Meyer Sets and Arithmeticity*

Approximate lattices are discrete subsets of locally compact groups that are aperiodic but nonetheless exhibit long range order. In abelian groups, these subsets correspond to the so-called quasi-crystals and were given a precise structure theory by Meyer: he showed that they are projections of arithmetic subsets in higher dimension. We will discuss how tools originating from ergodic theory, aperiodic order and the structure of finite approximate subgroups enable us to generalise at once Meyer's theorem and Margulis' arithmeticity. In particular we show that approximate lattices in  $SL_n(K)$ ,  $n \geq 3$  consist of matrices with coefficients in the set of Pisot numbers.