

# WARING'S PROBLEM AND FREIMAN'S THEOREM

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ABSTRACT. Freiman proved that when  $(k_i)$  is an increasing sequence of positive integers, then for each  $j$ , there exists  $s = s(j)$  having the property that all large integers  $n$  are represented as a sum of positive integral  $k_i$ -th powers (with  $i \in \{j, j+1, \dots, s\}$ ) if and only if  $1/k_1 + 1/k_2 + \dots$  diverges. We describe recent work joint with Joerg Bruedern making Freiman's theorem effective. Some concrete examples will be described, as well as the underlying progress on Waring's problem.