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Recent progress in the Waring-Goldbach problem

Recent progress on Vinogradov's mean-value theorem has resulted in improved estimates for exponential sums of Weyl type. In recent joint work with T.D. Wooley, we apply these new estimates to obtain sharper bounds for the function $H(k)$ in the Waring-Goldbach problem. We obtain new results for all exponents $k \geq 8$; in particular, we establish that $H(k) \leq (4k - 2) \log k + k - 7$ when k is large. The latter bound represents the first improvement on a classical result of Hua from the 1940s.