1054-11-153 **Julia Wolf*** (julia.wolf@cantab.net). *High-rank polynomial phase decompositions, with number-theoretic applications.*

When trying to count a certain type of arithmetic structure inside a set of integers, it is common to proceed by decomposing the indicator function of that set into a structured and a "random-looking" part.

We shall describe new decomposition theorems in the model setting of $\mathbb{F}_p^n$, where the random-looking part is small in the U^k norm for some $k > 3$, and the structured part consists of high-rank polynomial phases of degree at most $k-1$. These decomposition theorems are based on the recently proved inverse theorem for the U^k norm in this setting by Bergelson, Tao and Ziegler. We conclude by discussing some number-theoretic applications.

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