On the single-orbit conjecture for uncoverings-by-bases

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Let G be a group acting on a finite set Ω. A *base* for G is a sequence of points from Ω whose pointwise stabiliser is trivial. An *uncovering-by-bases* (or UBB) for G is a set $\mathcal{U}$ of bases for G such that any r-subset of Ω is avoided by at least base in $\mathcal{U}$, where r is a parameter depending on G and Ω. (UBBs arose in the author's work on coding theory, but are a purely group-theoretic object.)

It is conjectured that for any action of any group G, there exists a UBB contained within a single orbit of G on its irredundant bases. I will give some evidence as to why we believe this conjecture is true, and give proofs for some interesting cases of examples.

Some of the results are joint work with Peter Cameron (London).