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Title: Systolic freedom and rigidity modulo 2

The k-dimensional systole of an n-dimensional closed Riemannian manifold M is the infimal k-volume of a non-trivial k-cycle (with some coefficients). In '90s, Gromov asked if the product of the k-systole and the $(n-k)$-systole is bounded from above by the volume of M (up to a dimensional factor); this would manifest the *systolic rigidity.* Freedman exhibited the first examples with $k = 1$ and mod 2 coefficients where this fails; this manifests the *systolic freedom.* In a joint work with Hannah Alpert and Larry Guth, we showed that Freedman's examples are almost as "free" as possible, and the systolic rigidity almost holds, with $k = 1$ and mod 2 coefficients. Namely, on a manifold of bounded local geometry, $\mathrm{systole}_1(M) \cdot \mathrm{systole}_{n-1}(M) \leq c_\epsilon \mathrm{volume}(M)^{1+\epsilon}$, as long as the left-hand side is finite ($H_1(M; Z/2)$ is non-trivial). The proof, which I will explain, is based on the Schoen–Yau–Guth–Papasoglu minimal surface method.