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Homological isoperimetric inequalities of 2 dimensional complexes.

The homological filling function of a simply connected space is a generalized isoperimetric function describing the minimal volume required to fill a 1-cycle with an 2-chain. In the framework of homological characterizations of relative hyperbolicity, Groves and Manning posed the question of whether a simply connected 2-complex X with a linear homological isoperimetric inequality, a bound on the length of attaching maps of 2-cells and finitely many 2-cells adjacent to any edge must have a fine 1-skeleton. A graph is fine if for every edge e and each integer $n > 0$, the number of circuits of length n containing e is finite. We provide a positive answer to this question. In this talk, I will discuss our main result, give a brief overview of the proof, and state some related open questions.