Amenable category of three-manifolds

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A closed topological $n$-manifold $M^n$ is of ame-category $\leq k$ if it can be covered by $k$ open subsets such that for each path-component $W$ of the subsets the image of its fundamental group $\pi(W) \to \pi(M^n)$ is an amenable group. $\text{cat}_{ame}(M^n)$ is the smallest number $k$ such that $M^n$ admits such a covering. For $n = 3$, $M^3$ has ame-category $\leq 4$. We characterize all closed 3-manifolds of ame-category 1, 2, and 3.