A homology cobordism invariant derived from Floer homology

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Abstract

Let G be the homology cobordism group of oriented integral homology 3-spheres. Using instanton Floer theory we construct a surjective group homomorphism $h : G \to Z$ such that if the homology sphere Y bounds a smooth, compact, oriented 4-manifold with negative definite intersection form then $h(Y) \geq 0$, with strict inequality if the intersection form is not diagonal over the integers. This generalizes Donaldson's theorem for closed 4-manifolds.