SURVEY ON L^2-TORSION

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When the L^2-Betti numbers of the universal covering of a closed Riemannian manifold vanish, one can consider a very powerful secondary invariant, the L^2-torsion. We give a basic introduction to its construction, main properties and applications to topology, geometry and group theory. We also discuss a conjecture of Bergeron–Venkatesh relating it to homological growth. Finally we explain how one can twist it with finite-dimensional representations and get important new information. In particular we will explain how one can deduce the Thurston norm of an appropriate 3-manifold from the twisted L^2-torsion.