

# Distinguished Lecture Series

University of Notre Dame  
Department of Mathematics

Wolfgang Lück - University of Bonn, Germany

**Speaker:** Wolfgang Lück

University of Bonn, Germany

**Will give a lecture entitled**

$L^2$ -Betti numbers and their applications II

**Date:** Wednesday, April 10, 2019

**Time:** 4:00 PM

**Location:** 129 Hayes-Healy Hall



**Abstract:**

In the second lecture we present more advanced properties of  $L^2$ -Betti numbers. This includes their analytic interpretation in terms of heat kernels and the  $L^2$ -Hodge-de Rham Theorem. We compute the  $L^2$ -Betti numbers for the universal coverings of hyperbolic manifolds and manifolds of dimension less or equal to 3. Finally we deal with the Atiyah-Conjecture which predicts that the  $L^2$ -Betti numbers of the universal coverings of closed Riemannian manifolds with torsionfree fundamental groups are always integers. We link it to a problem about projective class groups of groups rings and other rings associated to von Neumann algebras and explain its consequences.