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*Roe  $C^*$ -algebra for groupoids and generalized Lichnerowicz Vanishing theorem*

We introduce the concept of Roe  $C^*$ -algebra for a locally compact groupoid whose unit space is in general not compact, and that is equipped with an appropriate coarse structure and Haar system. Using Connes' tangent groupoid method, we introduce an analytic index for an elliptic differential operator on a Lie groupoid equipped with additional metric structure, which takes values in the K-theory of the Roe  $C^*$ -algebra. We apply our theory to derive a Lichnerowicz type vanishing result for foliations on open manifolds.