

ABSTRACT. Let (\mathcal{M}, g) be a complete, noncompact Riemannian manifold of finite volume. For $w : \mathcal{M} \rightarrow (0, \infty)$ a weighting function, the w weighted unreduced L_2 cohomology is defined as the usual unreduced L_2 cohomology except that $d\text{vol}$ is replaced by the measure $w d\text{vol}$. This paper proves that in the case $\mathcal{M} = \Gamma \backslash G/K$ is a locally symmetric space of nonpositive sectional curvature and arbitrary rank whereupon $w(m) = e^{-\text{dist}(m, p_0)^2}$ is the Gaussian relative to some basepoint p_0 , the w weighted unreduced L_2 cohomology is isomorphic to the usual de Rham cohomology. This isomorphism extends to the standard coefficient bundles.

Note that weights for the de Rham cohomology of exponential decay have already been constructed; see [Bor83], [Bor90] and [Fra98]. The Gaussian weight behaves differently in terms of coefficient bundles.