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The Laplace equation on noncompact Ricci-flat manifolds

We will discuss geometric applications of the Laplace equation on a complete Ricci-flat manifold with Euclidean volume growth. We will focus on how to identify two arbitrarily far apart scales in the manifold in a natural way, exploiting the Łojasiewicz inequality of Colding-Minicozzi, in the case when a tangent cone at infinity has smooth cross section. We also prove a matrix Harnack inequality for the Green function when there is an additional condition on sectional curvature, which is an analogue of various matrix Harnack inequalities obtained by Hamilton and Li-Cao in different time-dependent settings.