

Almost Einstein manifolds and a (warped) product construction of Poincaré-Einstein metrics

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Almost Einstein manifolds satisfy a generalisation of the Einstein condition; they are Einstein on open dense subspace and, in general, have a conformal scale singularity set that is a conformal infinity for the Einstein metric. In the case of negative scalar curvature, compact almost Einstein manifolds are either Einstein or are composed of Poincaré-Einstein manifolds glued along the conformal infinities. Thus any general construction of almost Einstein manifolds provides a construction of Poincaré-Einstein structures. We describe a product type construction of compact almost Einstein and Poincaré-Einstein manifolds with the property that the resulting “interior” Einstein metric is a generalised warped product of Einstein metrics. In the collar neighbourhood of the conformal infinity these metrics agree with the Poincaré-Einstein collars obtained by the (Fefferman-Graham) ambient metric sub-product construction of arXiv:math/0608044. This is joint work with Felipe Leitner.