

Holography in conformal and CR geometry

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“Holography” in our context means geometric relationships between some non-compact complete Einstein manifolds and their boundary at infinities. For example, the standard conformal n -sphere can be naturally seen as the boundary at infinity of the $(n+1)$ -dimensional real hyperbolic space; this extends to a general correspondence between conformal manifolds and asymptotically hyperbolic Einstein manifolds, which has been a source of various problems in geometric analysis since 1980s. In the complex realm, there is a similar correspondence between $(2n+1)$ -dimensional CR manifolds and bounded strictly pseudoconvex domains in \mathbb{C}^{n+1} , the latter being seen as equipped with the unique complete Kähler-Einstein metric (with negative Ricci tensor).

I will discuss this idea with some emphasis on recent findings on characterization of conformal geodesics, a class of distinguished curves in conformal manifolds.