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Conformal gap theorems on S^4 and CP^2

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Abstract

An important conformal invariant quantity on a 4-manifold is the integral of the Chern-Gauss-Bonnet formula module the L^2 of the Weyl curvature part. In the talk, I will first survey some earlier works (joint with M.Gursky and P. Yang) where we characterizing 4-sphere using this invariant quantity; then report some recent work (joint with M. Gursky and Siyi Zhang) where we derive a conformal gap theorem for the 4-sphere and characterize manifolds in a neighborhood of CP^2 in terms of the same quantity. The main tool used in the proof is a study of a fully non-linear PDE of Monge-Ampere type and the Bach equation.