The Renormalized Area of Surfaces in $\mathbb{H}^3$

Álvaro Pámpano

Abstract

Motivated by the physical theory of the AdS/CFT correspondence of J. Maldacena, the renormalized area of minimal submanifolds in hyperbolic spaces was introduced in 1999 by C. Graham and E. Witten, who defined it as the Hadamard regularization of the area functional. The specific case of surfaces in $\mathbb{H}^3$ approaching the boundary at infinity $\partial_\infty \mathbb{H}^3$ at a right angle was further analyzed by S. Alexakis and R. Mazzeo in 2010, who found a connection between the renormalized area of minimal surfaces in $\mathbb{H}^3$ and the Willmore energy of such surfaces viewed, after a conformal change of metric, as Euclidean surfaces.

In this poster, we will further develop this connection extending it to general non-minimal surfaces approaching $\partial_\infty \mathbb{H}^3$, and present new results of the theory.