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Title: f -extremal domains in hyperbolic space.

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Abstract: In this talk we study the geometry and the topology of bounded and unbounded domains in the Hyperbolic Space \mathbb{H}^n supporting a bounded positive solution to an overdetermined elliptic problem. Under suitable conditions on the elliptic problem and the behaviour of the bounded solution at infinity, we are able to show that symmetries of the boundary at infinity imply symmetries on the domain itself. In dimension two, we can strengthen our results proving that a connected domain $\Omega \subset \mathbb{H}^2$ with C^2 boundary whose complement is connected and supports a bounded positive solution u to an overdetermined problem, assuming natural conditions on the equation and the behaviour at infinity of the solution, must be either a geodesic ball or, a horodisk or, a half-space determined by a complete equidistant curve or, the complement of any of the above example. Moreover, in each case, the solution u is invariant by the isometries fixing Ω .

This talk is based on two joint works with J. Mao, A. Farina and L. Mazet.