MULTIPLE-LAYER SOLUTIONS TO THE ALLEN-CAHN EQUATION ON HYPERBOLIC SPACE

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In this work we study the existence of multiple-layered solutions to the elliptic Allen-Cahn equation in Hyperbolic Space. More precisely, we consider the equation

$$-\Delta_{\mathbb{H}}u + W'(u) = 0, \tag{1}$$

where $\Delta_{\mathbb{H}}$ is the Laplace-Beltrami operator in Hypebolic space and W is a positive potential with two minima. We prove that for any given collection of non-intersecting hyperplanes in $\mathbb{H}$ there is a solution to (1) that has these hyperplanes as interfaces. Our result provides a Riemannian generalization of the work of M. del Pino, M. Kowalczyk, F. Pacard and J. Wei.