

# Quasisymmetric non-parametrizability of product spaces associated with the Whitehead continuum

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## Abstract

This talk is based on joint work with Juha Heinonen.

The decomposition space  $\mathbf{R}^3/W$  associated with the Whitehead continuum  $W$  is obtained by collapsing  $W$  to a point.  $\mathbf{R}^3/W$  is not homeomorphic to  $\mathbf{R}^3$ , however the product space  $(\mathbf{R}^3/W) \times \mathbf{R}^m$  is homeomorphic to  $\mathbf{R}^{3+m}$  for  $m \geq 1$  (known to topologists since 60's). Geometrically, when equipped with a Semmes metric on  $\mathbf{R}^3/W$  and the Euclidean metric on  $\mathbf{R}^m$ , the product  $(\mathbf{R}^3/W) \times \mathbf{R}^m$  is then Ahlfors  $(3 + m)$ -regular and linearly locally contractible. We show that  $(\mathbf{R}^3/W) \times \mathbf{R}^m$  does not admit any quasisymmetric homeomorphism onto  $\mathbf{R}^{3+m}$ .

A deeper question of Siebenmann and Sullivan asks the existence of quasisymmetric homeomorphism from the double suspension of a 3-dimensional homology sphere onto  $\mathbf{S}^5$ .