A non-existence result for the L_p-Minkowski problem

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Abstract. We show that given a real number $p < 1$, a positive integer n and a proper subspace H of $\mathbb{R}^n$, the measure on the Euclidean sphere $\mathbb{S}^{n-1}$, which is concentrated in H and whose restriction to the class of Borel subsets of $\mathbb{S}^{n-1} \cap H$ equals the spherical Lebesgue measure on $\mathbb{S}^{n-1} \cap H$, is not the L_p-surface area measure of any convex body. This, in particular, disproves a conjecture from [Bianchi, Böröczky, Colesanti, Yang, The L_p-Minkowski problem for $-n < p < 1$, Adv. Math. (2019)].