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Local L^p-Brunn–Minkowski inequalities for $p < 1$

The L^p-Brunn–Minkowski theory for $p \geq 1$, proposed by Firey and developed by Lutwak in the 90's, replaces the Minkowski addition of convex sets by its L^p counterpart, in which the support functions are added in L^p norm. Recently, Böröczky, Lutwak, Yang and Zhang have proposed to extend this theory further to encompass the range $p \in [0, 1)$, conjecturing an L^p-Brunn–Minkowski inequality for origin-symmetric convex bodies in that range, which constitutes a strengthening of the classical Brunn-Minkowski inequality. Our main result confirms this conjecture locally for all (smooth) origin-symmetric convex bodies and $p \in [1 - \frac{c}{n^{3/2}}, 1]$.
Based on a joint work (very much in progress) with Alexander Kolesnikov.