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Jeong Hyun Kang* (jkang@westga.edu), University of West Georgia, Department of Mathematics, Carrollton, GA 30118. *Equidistant set in \mathbb{R}^d under ℓ_1 -norm*. Preliminary report.

Kusner (1983) conjectured that the maximum size of a set whose elements are pairwise equidistant under the ℓ_1 -norm in \mathbb{R}^d is $2d$. If true, this would be sharp. The conjecture has been proved for $d = 3$ (in 1998) and $d = 4$ (in 2000). Alon and Pudlak gave an upper bound of $O(d \ln d)$ (in 2003).

We show that the Kusner conjecture is true if given an ℓ_1 -equidistant set of cardinality at least $2d$ in \mathbb{R}^d there exists a subset of size $3d/2$ on a single unit ℓ_1 -sphere. Also, we show that every three points of an ℓ_1 -equidistant set belong to a unit ℓ_1 -sphere, and the centers of these induced unit spheres are contained in a particular hyperplane. This leads to new proofs of Kusner's conjecture for the cases of $d = 3$ and 4. (Received August 11, 2015)