

1095-11-137

J. Carmelo Interlando* (interlan@mail.sdsu.edu), San Diego State University, Department of Mathematics and Statistics, 5500 Campanile Drive, GMCS 415, San Diego, CA 92182-7720.

New Dense Lattice Packings via Linear Algebra.

Let A and B be lattices of dimensions m and n , both greater than one. It is no loss of generality to assume that $d_{\min}(A) = d_{\min}(B) = 1$. We first note that A and B can always be immersed in \mathbb{R}^{m+n-1} and then glued along their common sublattice \mathbb{Z} generated by one of the shortest vectors. This simple observation yields lattices of record center densities in dimensions 248, 520, and 4098. Furthermore, if the kissing numbers of A and B are greater than one and the lattices have a common sublattice C of dimension two, then we show that A and B can be immersed in \mathbb{R}^{m+n-2} and then glued along C . This type of construction yields sphere packings denser than previously known ones in dimensions 52, 68, and 84. The relevant parameters (dimension, minimum distance, and kissing number) of the new lattices are given in terms of the respective parameters of A , B , and C . (Received September 06, 2013)