1056-06-2154 **Scott Kominers***, Harvard University, Department of Mathematics, Cambridge, MA.
Configurations of extremal type II lattice and codes.

Type II lattices and codes have been studied extensively because of their important applications to the theory of sphere packing. Using *weighted theta series*, generating functions that encode the norms and distributions of lattice vectors, Ozeki showed a series of configuration results for extremal Type II lattices of ranks 32, 40, and 48. We extend these configuration results, showing that if L is an extremal Type II lattice of rank 56, 72, or 96 then L is generated by its minimal-norm vectors, and if L is such a lattice of rank $40r$ ($r = 1, 2, 3$) then L is generated by its vectors of lengths $4r$ and $4r + 2$. Using *harmonic weight enumerators*, discrete analogs of weighted theta functions, we obtain configuration results for extremal Type II codes of lengths 32, 48, 56, 72, and 96 analogous to the results for lattices of those ranks. (Received September 29, 2009)