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Andrew Yang* (ayang@math.dartmouth.edu), Department of Mathematics, 27 North Main Street, 6188 Kemeny Hall, Hanover, NH 03755. *On the low-lying zeros of Dedekind zeta functions associated to cubic number fields.*

The Katz-Sarnak philosophy asserts that to any “naturally defined family” of L-functions, there should be an associated symmetry group which determines the distribution of the low-lying zeros of those L-functions. We consider the family of Dedekind zeta functions of cubic number fields, and we predict that the associated symmetry group is symplectic. To analyze the low-lying zeros of this family, we start by using (as is standard in these types of problems) a variant of the explicit formula used by Riemann to study the Riemann zeta function. This reduces the problem to understanding the distribution of how rational primes split in cubic fields of absolute discriminant X , as X tends to infinity. This can be analyzed by using the work of H. Davenport and H. Heilbronn on the asymptotics of the number of cubic fields as the absolute discriminant tends to infinity. The final ingredient is a recent result of K. Belabas, M. Bhargava, and C. Pomerance on power-saving error terms in the count of cubic fields considered by Davenport and Heilbronn. If time permits we will discuss the adjustments that can be made to this argument to prove a similar result for S_4 quartic number fields, using Bhargava’s generalization of the work of Davenport and Heilbronn. (Received August 21, 2009)