

Integral Graphs are Very Rare

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Call a graph **Integral** if every eigenvalue of its adjacency matrix is an integer (or equivalently, if it has no irrational eigenvalues). Although several classes of integral matrices are known (e.g. hypercubes, or Paley graphs on a odd square prime power number of vertices), it is believed that they are in general quite rare. Ahmadi, Alon, Blake, and Shparlinski confirmed this by showing that the probability a random graph is integral is exponentially small.

I will describe recent work with Parker Williams improving this bound by showing only at most a $2^{-cn^{3/2}}$ proportion of all graphs are integral.