There are several questions about the zero set of Laplace eigenfunctions that have proved to be extremely hard to deal with and remain unsolved. Among these are the study of the size of the zero set, the study of the number of connected components, and the study of the topology of such components. A natural approach is to randomize the problem and ask the same questions for the zero sets of random linear combinations of eigenfunctions (known as monochromatic random waves). In this talk I will present some recent results in this direction related to the study of the topology and the nesting of the components of the zero sets of these monochromatic random waves. The results I'll present are based on joint works with Boris Hanin and Peter Sarnak.