Abstract Submitted
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Are random wave fields filamentary?[1] ALEXANDER DAVIS, STEVEN TOMSOVIC — O'Connor, Gehlen, and Heller [1] studied random superpositions of plane waves, mostly numerically, to understand the eigenstates of quantum chaotic systems better. They argued that the random states have ridges, which exhibit a filamentary-like structure. This begs the question as to how to detect whether data exhibits a filamentary nature. A number of algorithms to construct filaments from data have been introduced, but apparently little work has concentrated on the simpler question, "how filamentary is some data set?" We introduce a particularly simple use of the dot product formed from two vectors defined by any three local intensity maxima. Excess alignment relative to random data would generate higher probabilities of finding angles near 0 and 180 degrees. We show results for random superpositions of plane waves using the locations of local intensity maxima and also consider correlations between positions of local intensity maxima and their intensities.

[1] P. W. O'Connor, J. Gehlen, and E. J. Heller, Phys. Rev. Lett. 58,1296 (1987).

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