

Abstract Submitted
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Is there quantum chaos in the prime numbers? TODD TIMBERLAKE, JEFFERY TUCKER, Berry College — A statistical analysis of the prime numbers indicates possible traces of quantum chaos. We have computed the nearest neighbor spacing distribution, number variance, skewness, and excess for sequences of the first N primes for various values of N . All four statistical measures clearly show a transition from random matrix statistics at small N toward Poisson statistics at large N . In addition, the number variance saturates at large length scales as is common for eigenvalue sequences. This data can be given a physical interpretation if the primes are thought of as eigenvalues of a quantum system whose classical dynamics is chaotic at low energy but regular at high energy. We will discuss some difficulties with this interpretation in an attempt to clarify what kind of physical system might have the primes as its quantum eigenvalues.

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