Abstract Submitted
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Chaos in quantum many-body systems[1] GARY MITCHELL, North Carolina State University — To describe the fluctuation properties of neutron resonance spacings, Wigner made the first application of Random Matrix Theory (RMT) to nuclear physics. This approach has proven remarkably successful, but the development was both lengthy and sporadic. Data of sufficiently high quality (both pure and complete) were limited in sample size. Bohigas and colleagues combined the best available neutron and proton resonance data to provide conclusive evidence for agreement with the predictions of the relevant version of RMT – the Gaussian Orthogonal Ensemble (GOE). Subsequent tests of spectra (level statistics) in different mass and energy regions are reviewed. The transition strength distribution for one channel follows a chi squared distribution of one degree of freedom (the Porter-Thomas distribution), which results from a Gaussian distribution for the transition amplitudes. The (relatively recent) precise experimental confirmation of the Gaussian distribution is described. In spite of the extremely successful application of RMT in many fields, development in nuclear physics has been relatively limited. The primary reason is that the the standard measures used to analyze the expermental data are too sensitive to mistakes. An alternative measure is suggested.

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Gary Mitchell
North Carlolina State University

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