RESONANCE WIDTH DISTRIBUTION: PORTER-THOMAS OR WHAT?

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At the region of low-energy neutron resonances, the nucleus is an example of a complex many-body open system with strong intrinsic interaction between the constituents and coupling to the continuum. The internal interaction creates exceedingly complicated − *chaotic* − states of the compound nucleus. The coupling to the decay channels makes those states quasistationary and eventually leads to the collectivization through continuum and effects of super-radiance known from quantum optics, the trend that is not accounted for by standard treatment. The typical neutron resonances are just in the beginning of this process; however these effects are observable and lead [1] to the violation of the Wigner-Dyson level spacing distribution, correlations between resonance energies and their widths, and deviations from the Porter-Thomas neutron width distribution in the direction of what has been found in recent precise measurements [2] and claimed to be a failure of nuclear theory [3].

REFERENCES

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