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Characterizing the frequency response curve of large rooms in the short and long time regimes[1] ANNA KLALES, SUZANNE PITTMAN, MATTHEW BARR, MARIO BORUNDA, ERIC HELLER, Harvard University — Room acoustics can be modeled by real Gaussian statistics, corresponding to randomized ray trajectories and characterized for instance by the reverberation time T60 (free field to decay by 60 decibels) which is independent of position or source point in a room. In his 1954 paper, Manfred Schroeder found universal statistical features of the steady state frequency response curve of large rooms, based upon the assumption of Gaussian probability distributions of the pressure. For example, he found the standard deviation from the mean level is 11 decibels for any concert hall, regardless of the shape of the room or its T60, within reasonable limits. Using semi-classical and numerical methods, we find non-universal (room dependent) corrections to Schroeder's universal results for the statistics of the frequency response curve. Along with corrections to the steady-state frequency response, we present the behavior of the frequency response curve for short to intermediate times.

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