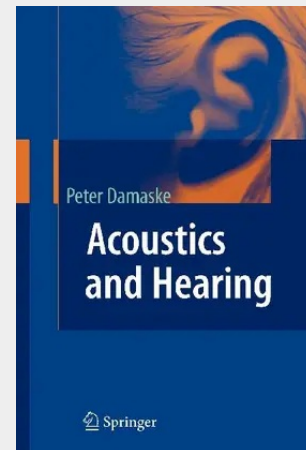


Acoustics and Hearing

In a good concert hall, a big orchestra can evoke remarkably spacious sounds. The concertgoer is surrounded by the physical sound waves, and out of these waves the subjective sound impressions are created in the listener's head. This biological "measuring device" organized itself during childhood. With no special effort—and quite continuously—it performs parallel data processing and makes no distinction between complex or simple analysis. Imagine that the orchestra, after complete silence, strikes a loud, abrupt chord. In that moment we can watch the immediate response of the hall. The phenomenon is called the onset of reverberation. During this process the listener's auditory system has to evaluate the direct sound of each particular musical instrument along with portions of sound reflected from the walls or the ceiling. If those sound reflections arrive at the listener's ears less than 50 ms later than the direct sound, they are called early reflections. All these amounts of sound make up such an intricate mixture that the ear is unable to resolve it as a series of separate events. From a favourable seat in the auditorium the listener receives only one complex impression, which can be wide and yet very detailed and appears abruptly in the front. This subjective impression may briefly be named a sound image. Its width and its depth, its facets and the weights or contrasts of its different parts characterize "the acoustics" of the concert hall and also the orchestra.

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106,99 €
99,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9783540782278
Medium: Buch
ISBN: 978-3-540-78227-8
Verlag: Springer
Erscheinungstermin: 03.06.2008
Sprache(n): Englisch
Auflage: 2008
Produktform: Kartoniert
Gewicht: 213 g
Seiten: 120
Format (B x H): 155 x 235 mm

