

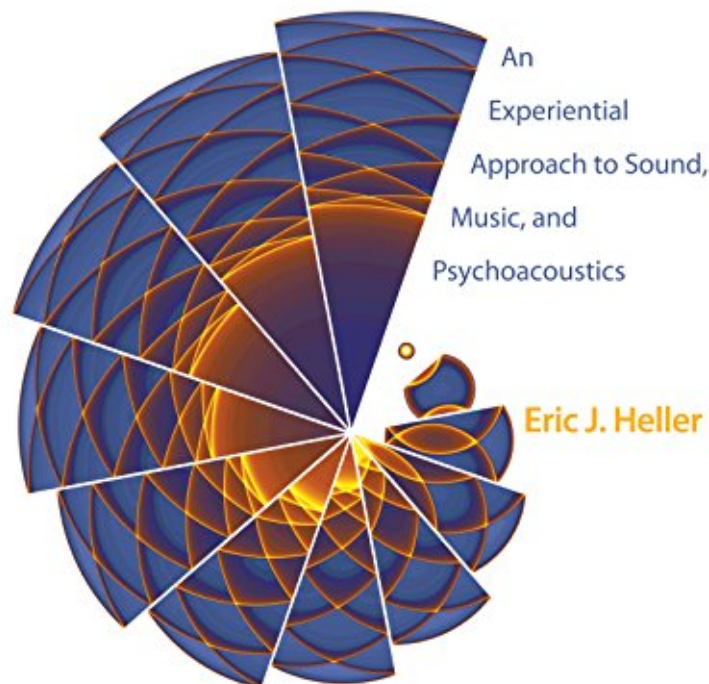
[Ebook free] Why You Hear What You Hear: An Experiential Approach to Sound, Music, and Psychoacoustics

Why You Hear What You Hear: An Experiential Approach to Sound, Music, and Psychoacoustics

Eric J. Heller

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Why You Hear What You Hear



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Eric J. Heller : Why You Hear What You Hear: An Experiential Approach to Sound, Music, and Psychoacoustics before purchasing it in order to gage whether or not it would be worth my time, and all praised Why You Hear What You Hear: An Experiential Approach to Sound, Music, and Psychoacoustics:

7 of 7 people found the following review helpful. An Insightful BookBy Dave in Painted PostI have been reading Prof. Heller's book rather steadily since receiving it so promptly via Prime.On the plus side: (1) the writing style is informal, non mathematical and informative, (2) there are some interesting explanations of phenomena that are often glossed over by resorting to dry mathematical derivations sans insightful comments in other books, (3) Heller makes extensive use of the autocorrelation as a metric for estimating pitch. Many physics of music and acoustics texts give a one sentence definition of pitch and move on. (4) there are many graphs and pictures to augment the discussion.On the negative side: (1) Prof. Heller's explanations occasionally become a bit convoluted and his arguments sometimes

appear to be circular in that he uses a concept that he is attempting to explain to also support his arguments. (2) many of the graphs use color but are often quite small and the axes are not labeled. (3) Heller occasionally inserts some mathematics into the discussion but in my humble opinion not effectively. His discussion of waves gets descriptively entangled while he could have concisely and clearly presented the material via the wave equation. His discussion of traveling waves on a vibrating string seems lacking. (4) I have applied Matlab to his many examples, especially those dealing with the autocorrelation and I have found errors in his conclusions as to the pitch. Although excited about this supposedly neat tool for estimating pitch, I am a bit mystified at his use of it. I wish there were a way to communicate my concerns to Prof. Heller but his web site gives no email nor does the Harvard faculty directory. I suppose that his fame precludes accessibility. In spite of these negative comments, I greatly value this book and have learned a lot from it. I continue to read and study it...but with a jaundiced eye. 3 of 3 people found the following review helpful. Beautiful and groundbreaking treatment of sound waves

By William G. Harter Finally, musicians, piano technicians, and any intelligent person who enjoys music and the sounds of nature has a clearly written and beautifully illustrated textbook to learn about those waves that are bouncing around and inside one's ears. Heller has used his knowledge of waves gained from decades of leading research on quantum wave-packets to bring sound wave mechanics and its human experience to a general audience. Heller has also used his talent as an artist and expertise in computer graphics to provide lavish illustrations to expose what would otherwise be a highly mathematical subject. The book grew out of a Harvard course intended for non-science majors on music and acoustics. It has resulted in an exposition that all can learn from and enjoy, even some of those geeky science majors! 2 of 2 people found the following review helpful. great book, which works at many levels

By Michael Cohen I am learning a lot from this book. The author has a deep intuition about physics and acoustics, which he conveys to the reader via many examples and illustrations, many of which I hadn't encountered in other similar textbooks. The writing style is occasionally awkward, and like a lot of clever people, sometimes Prof. Heller doesn't realize how much more clever he is than "ordinary" readers. The Kindle version is often quite convenient (including the ability to call up international dictionaries), but the equation formatting isn't very pretty (not the author's fault!). His use of the Falstad "Ripple" app (also available as a stand-alone app for iOS) is welcome, as one can often learn more from interactive demonstrations than from even patient explanations. This is a rich and deep resource, to which students and their teachers can return indefinitely to continuously mine for ideas and insights.

Why You Hear What You Hear is the first book on the physics of sound for the nonspecialist to empower readers with a hands-on, ears-open approach that includes production, analysis, and perception of sound. The book makes possible a deep intuitive understanding of many aspects of sound, as opposed to the usual approach of mere description. This goal is aided by hundreds of original illustrations and examples, many of which the reader can reproduce and adjust using the same tools used by the author (e.g., very accessible applets for PC and Mac, and interactive web-based examples, simulations, and analysis tools will be found on the book's website: [whyyouhearwhatyouhear.com](http://www.whyyouhearwhatyouhear.com).) Readers are positioned to build intuition by participating in discovery. This truly progressive introduction to sound engages and informs amateur and professional musicians, performers, teachers, sound engineers, students of many stripes, and indeed anyone interested in the auditory world. The book does not hesitate to follow entertaining and sometimes controversial side trips into the history and world of acoustics, reinforcing key concepts. You will discover how musical instruments really work, how pitch is perceived, and how sound can be amplified with no external power source. Sound is key to our lives, and is the most accessible portal to the vibratory universe. This book takes you there. The first book on sound to offer interactive tools, building conceptual understanding via an experiential approach

Supplementary website (<http://www.whyyouhearwhatyouhear.com>) will provide Java, MAX, and other free, multiplatform, interactive graphical and sound applets Extensive selection of original exercises available on the web with solutions Nearly 400 full-color illustrations, many of simulations that students can do

"Why You Hear What You Hear . . . has much to interest physicists and physics students. . . . This book contains a lot of physical insight, and I think it will be the rare acoustician who does not enjoy reading it. I particularly liked the use of color coding to introduce (with a minimum of math) a graphical algorithm to represent autocorrelation. Also interesting are the author's diversions into history, including a story in which John William Strutt (Lord Rayleigh) and William Henry Bragg seem to have been mistaken about an echo transposed in pitch. . . . Acousticians will enjoy its interesting perspectives, and physicists and engineers outside of acoustics will find it an attractive introduction to some important parts of the discipline."--Joe Wolfe, *Physics Today*"This book contains a lot of physical insight, and I think it will be the rare acoustician who does not enjoy reading it. . . . Acousticians will enjoy its interesting perspectives, and physicists and engineers outside of acoustics will find it an attractive introduction to some important parts of the discipline."--Joe Wolfe, *Acoustics Australia*"This book by a distinguished professor of chemistry and physics at Harvard is a joy to read. . . . I highly recommend this as a book to be read, preferably with the book's website on a computer nearby for easy and frequent reference."--Thomas D. Rossing, *Journal of the Acoustical Society of America*"This book is highly instructive for people with an interest in the wave aspects of sound, for anyone interested

in how musical instruments fundamentally work and why they sound how they sound, and for those interested in the human perception of sound. It is richly illustrated in full color, printed on high-quality paper and at an excellent standard of bookmaking. It deserves a clear recommendation for a wide readership."--Manuel Vogel, Contemporary Physics

From the Back Cover"Rich in explanations and do-it-yourself activities, and assuming only a high school background, this is the best text I know on how sound actually works. But what makes this book truly a treasure is the degree to which it is so fully informed by Heller's particular scientific genius: he shows by example after example how to think through complex and nonlinear systems to capture their essential features, leading to deep, novel, and practically applicable insights."--David Politzer, Nobel Laureate in Physics

"This delightful book is written for a wide-ranging audience with diverse interests and musical/acoustical backgrounds. With detailed and physically intuitive discussions, interesting historical information, richly illustrated figures, exemplary sound files, and interactive computer animations (via whyyouhearwhatyouhear.com), this textbook covers an abundance of acoustical physics topics associated with the generation of sound, sound propagation, music, musical instruments, human perception of sound, room acoustics, and much more."--Steven Errede, University of Illinois, Urbana-Champaign

"Covering a massive amount of material, this sweeping book contains sophisticated concepts and an immense amount of information, and includes topics left out in other books on the same subject. Singular and unique, it has no worthy competitors."--William Bickel, University of Arizona

"This book--with its accessibility and breadth of scholarship--is an impressive work that I would recommend highly. This is a fantastic addition to the subject."--Paulo Bedaque, University of Maryland

About the AuthorEric J. Heller is the Abbott and James Lawrence Professor of Chemistry and Professor of Physics at Harvard University, and a member of the National Academy of Sciences.