

BOOK REVIEW

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Physics of Continuous Matter: Exotic and Everyday Phenomena in the Macroscopic World by Benny Lautrup (610 pages, Institute of Physics Publishing, Bristol and Philadelphia) is a modern, rigorous and unusually comprehensive introduction into the physics of continua. The book is structured into 32 chapters, divided into five parts (i.e., Introduction, Fluids at rest, Deformable solids, Basic hydrodynamics and Special topics), addressing both the prevalent university syllabus and more exotic topics such as gravity waves, dynamics of vortices, self-similar boundary layers, subsonic flights, etc. Furthermore, the book has three appendices dedicated to Newtonian particle mechanics, curvilinear coordinates and thermodynamics of ideal gases, and additional material can be found on the book's home-page at <<http://www.lautrup.nbi.dk/continuum>>. All the above along with an extensive index and an annotated bibliography make the book an invaluable tool for both graduate and under-graduate students.

A common misconception of most physics students is that physics of continuous matter is a very mathematical subject. Lautrup's book, however, gives an excellent account of all major topics on the subject starting only from the most elementary mathematics and introducing the rest on a need-to-know basis. Most chapters have a light commencement which appeals to our everyday experience with the macroscopic world, and then slowly introduce the key physical concepts. Short historical notes, sketchy micro-biographies of great scientists, marvelous graphical side-notes along with a few tables of constants make the text a gratifying reading. All chapters end with a few problems some of which are theoretical side-issues of the main text. Among the many qualities of this book there are five that deserve special attention. First, equations are dealt with in a very scholastic manner, the most important ones being placed in a box. Second, the author took great care in marking the sections and the problems which either fall slightly outside the main line of the text or they require more advanced mathematics. Third, there are quite a number of footnotes which give valuable up-to-date references to many of the subjects dealt with in the main text. This particular feature makes it perfect for readers just starting their graduate studies who desire also a glimpse at the current research. Fourth, and rather rare for textbooks on this subject, the book gives a balanced view on mechanics of continua by accompanying well-known analytical methods with various numerical

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techniques. For this reason two chapters have been dedicated to computational aspects of elastostatics and fluid dynamics and a number of Mathematica codes are freely available on the book's home-page. Fifth, and foremost important, the chapters can be used to some extent independent of one another and, of course, this was done with the cost of some repetitions. However, when reading the book in full these repetitions come as a welcomed and sometimes necessary refresher on previously discussed subjects, only to underline its pedagogic nature.

At first glance the book stems out of a set of lectures delivered by the author for a number of years at Copenhagen University, Denmark. More intimately however, this almost encyclopedic book is due to the author's joy of doing physics, no matter its flavor. A high energy physicist by training Benny Lautrup has written a magnificent book on one of the oldest subjects in science, a book that I wholeheartedly recommend to any student with a keen interest in physics. This is a book written by an impassioned physicist for impassioned students.