



“Physics in Canada”
Book Review

“La Physique au Canada”
Critique de livre

Introduction to nonlinear optics. by Geoffrey New, Cambridge University Press (2011), ISBN 978-0-521-87701-5, price \$75.00.

There exists a plethora of excellent books on nonlinear optics. Why, then, was there a need for *Introduction to Nonlinear Optics* by Geoffrey New? The claimed goal, as revealed by the title, was to provide an introduction to the topic. The author successfully accomplished this goal and I would personally recommend this book to graduate students. The tone of the text is very didactic, but not too formal, making the essential of the content approachable.

The book covers several aspects of nonlinear optics. After a brief introduction, second- and third-order phenomena are discussed in details. Crystallography and optics with pulses are also presented before “some quantum mechanics”. The book is completed with a discussion on resonant effects and high harmonic generation. Problems, with answers, are available at the end of each chapter. Most of these topics are standard in books on the subjects, but the author was able to find unique and new ways of explaining and illustrating fundamental concepts graphically with figures.

The most interesting and unique feature of the book is the presence of two chapters in which primarily linear phenomena are discussed. Indeed, a chapter is dedicated to crystal optics and another one to dispersion and optical pulses. These chapters serve to provide the essential background prior to the introduction of nonlinear optics in crystals and nonlinear optics with pulses. This explicit pairing truly enriches the discussion, and makes the material more accessible to readers who are being initiated to the topics.

The modular structure of the book also plays an important role in giving it its introductory flavour. In fact, it is a remarkable achievement to keep crystallography, tensors, and quantum mechanics to a limited number of chapters where they are essential, without losing much of the physical richness in the remaining chapters. Here, the overall minimization of the mathematical content helps focusing on the important ideas. Personally, I found that less equations enabled me to better appreciate the perspective shared by the author.

Introduction to Nonlinear Optics by Geoffrey New is a very pleasant read, even for physicists well versed into the field. The quality of the physical descriptions and of the writing will certainly provide a positive first exposure to nonlinear optics to advanced undergraduate or early graduate students. The book might not serve as a reference, but is certainly a great prelude to more extensive texts on the subject.

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