

and he dives into examples from the literature, presenting data and interpreting nuances.

In contrast, Boyd's emphasis is on the fundamentals, not on the application; he touches on slow light in chapter 3, where he treats the quantum mechanical theory of nonlinear optical susceptibilities, and later in chapter 6, where he covers two-level systems. Boyd's text sticks to pedagogy throughout and mostly cites the literature for relevant research applications.

Other chapters in the second half of He's book are written in the same spirit and give practical examples from the research literature in a tone well suited for a reference book, in stark contrast to Boyd's pedagogical approach. Whereas He discusses soliton lasers, temporal solitons, light and dark spatial solitons, and how solitons are formed—and provides many illustrations from the literature—Boyd offers only a short section on solitons, though in enough depth to give the reader an intuitive grasp. Both books cover response functions in their introductions to nonlinear susceptibilities, but Boyd's presentation is somewhat more rigorous and covers the Kramers–Kronig relations, which He later uses but never derives.

Nonlinear optics generally deals with macroscopic phenomena, such as nonlinear wave propagation and parametric mixing, and the microscopic origins of the nonlinear response. The most natural pedagogical sequence starts with the quantum source of nonlinearity, relates that source to bulk nonlinear susceptibilities, and then shows how those enter into Maxwell's equations, which are then solved for various phenomena.

However, He chooses to delay until the end of the book a discussion of the microscopic theoretical development, even though he refers to it repeatedly when the microscopic results are needed earlier. That makes the early chapters somewhat difficult to follow because the expressions are introduced in a hand-waving way and the reader is frequently sent to the back of the book for details. An experienced researcher with a cursory knowledge of NLO may be equipped with the intuition needed to follow such heuristic arguments, but a student learning the material for the first time will likely have difficulty.

Since modern NLO books use SI units, I cannot blame the author for doing the same. Still, all the instances of epsilon naughts (ϵ_0) that senselessly pepper the equations are a distraction. More to the point, James Clerk Maxwell

unified the electric and magnetic fields, so why have physicists chosen to hide the beauty of the symmetry by adopting a convention in which the electric and magnetic fields have different units?

The well-presented, broad coverage of useful topics and practical examples in *Nonlinear Optics and Photonics* will make it a valuable reference for researchers and graduate students specializing in NLO; the latter group may enjoy He's book for its practical content. However, it will probably not displace the third edition of Boyd's *Nonlinear Op-*

tics, which offers a pedagogical style that will be more accessible to the typical graduate student. In the end, it's a matter of taste.

Mark Kuzyk
Washington State University
Pullman

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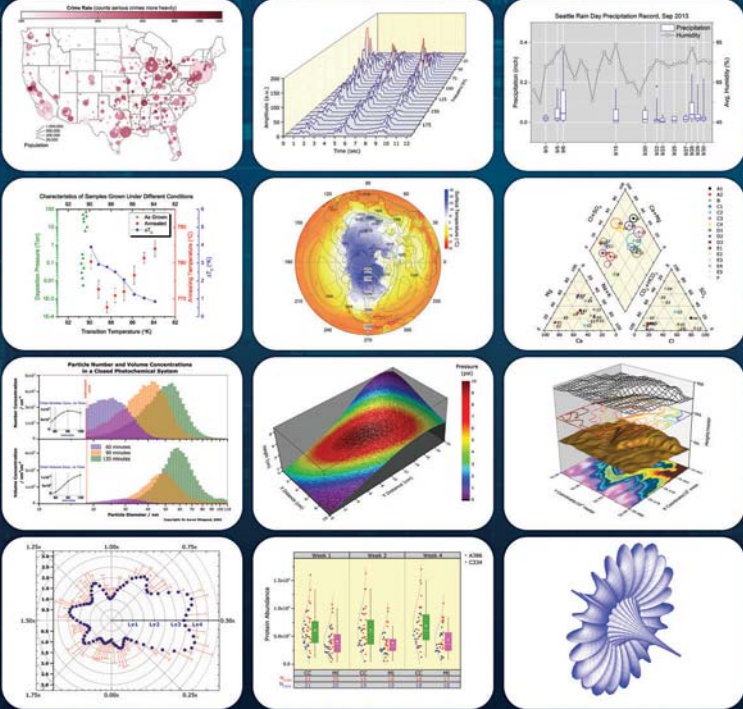
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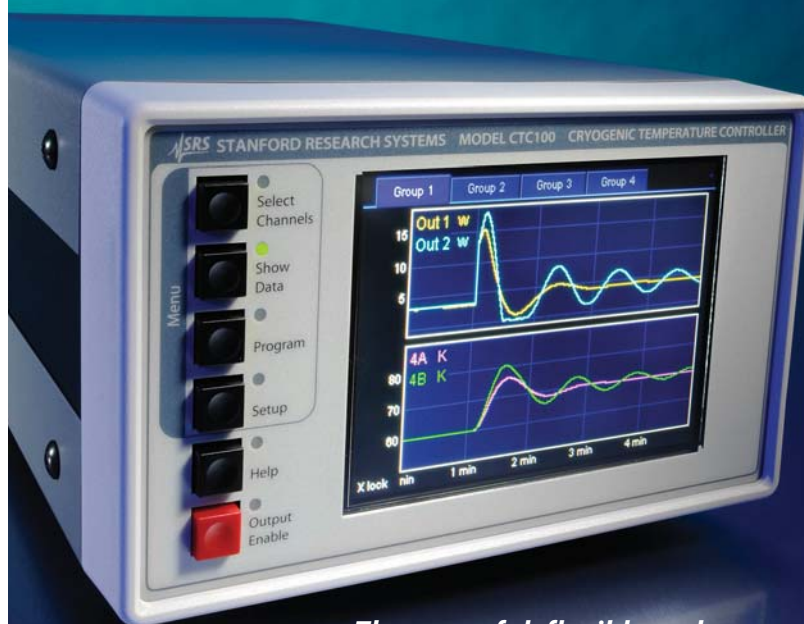
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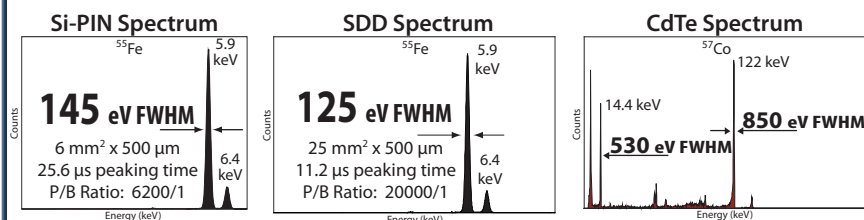
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