Basic Electro-Optics for Electrical Engineers

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Glenn D. Boreman

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Preface

This book is an outgrowth of a short course frequently given over the past ten years for The International Society for Optical Engineering (SPIE). Basic optical-engineering concepts are covered in a manner accessible to anyone with a preparation equivalent to a bachelor's degree in electrical engineering. Students with backgrounds in mechanical engineering, technology, and management have also taken the course successfully.

The topics covered are those most likely to be useful in an entry-level, laboratory-oriented setting. These include: imaging, radiometry, sources, detectors, and lasers. Special emphasis is placed on flux-transfer issues, which are particularly important in practical measurements. A first-order approach is taken throughout, so that the student can quickly make the back-of-the-envelope calculations necessary for initial setup of optical apparatus. The treatment is at an elementary conceptual and computational level.

The material contained herein represents some of what I wished I had known about optics when I first began working as an engineer, fresh from The University. Over the intervening years, I have developed the opinion that, while valuable for advanced students, such topics as the eikonal equation or the method of stationary phase are not as important for the young engineer as answers to questions like: where is the image, how big is it, how much light gets to the detectors, and how small of an object can we see?

I would like to thank the students who have taken my SPIE short courses on this material. Their questions and enthusiasm have provided the impetus for a number of revisions of the presentation. Special thanks are also due to Eric Pepper of SPIE, who has shown remarkable patience with innumerable schedule slippages. His unfailing optimism and cheerfulness are sincerely appreciated.

Finally, I want to thank my favorite technical editor, Maggie Boreman, for the time that she has invested in this project, transforming my convoluted prose into standard English.

GDB
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