

# Preface

This book on Classical Electrodynamics grew out of a set of lecture notes for a fourth-year undergraduate course that I taught at the National University of Singapore (NUS) in recent years. The presentation is rather detailed and does not skip intermediate steps that — as experience shows — are not so obvious for the learning student.

As a rule, students would have taken two earlier courses on Electricity and Magnetism in their second and third years, so that they arrive with a solid knowledge of the basic material. The fourth-year course, then, deals with advanced topics, many of which could well be part of a post-graduate course on advanced electrodynamics.

When preparing these lectures, I did not follow any of the standard textbooks on the subject, but I frequently consulted the notes I had from the lectures that Julian Schwinger gave at the University of California, Los Angeles (UCLA) in the early 1980s. Any similarity between this book and the published version of Schwinger's lectures\* is, therefore, not accidental. But, of course, Schwinger covered much more ground in two quarters at UCLA than I could in one semester at NUS.

The material of this book is my personal selection for that one-semester fourth-year course, presented in full during twenty two-hour lectures. There is a strong emphasis on the properties of electromagnetic radiation as they follow directly from Maxwell's equations. Other lecturers will surely omit some of the material of my choice in favor of topics that I did not choose to include, such as the propagation of light in media or wave guides. Accordingly, there is no ambition of, and no attempt at, treating each and every aspect of electromagnetism in these notes — they just represent what I could and would deal with in one semester.

\*J. Schwinger, L.L. DeRaad, Jr., K.A. Milton, and W.-y. Tsai, *Classical Electrodynamics* (Perseus Books, Reading, 1998)

This book owes its existence to the outstanding teachers, colleagues, and students from whom I learned so much. I dedicate these lectures to them.

I am grateful for the professional help by the staff of World Scientific Publishing Co., which was crucial for the completion. I acknowledge the invaluable support of Miss Lai Fun Kwong with sincere gratitude. Dr. Yin Lu deserves a particular thank-you for turning the original handwritten notes into an electronic version that I could then edit, and I am much obliged to Dr. Paul Condyllis who took time off to record the diffraction patterns on pages 181–186.

I wish to thank my dear wife Ola for her continuing understanding and patience by which she is giving me the peace of mind that is the source of all achievements.

Singapore, May 2014

*BG Englert*