PHYSICS OF DENSE MATTER

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To My Parents

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PREFACE

This book grew from lecture notes prepared for a ten-week summer short-course on dense matter physics that I gave to a group of students and physicists at the Beijing Normal University (China) in 1979. My aim was to introduce the field of dense matter physics which saw rapid development in the past ten to fifteen years to an audience who was not yet active in the field. I wanted to make the subject matter as simple and yet as complete as I could by concentrating on only a few well-developed topics, and I tried to spell out all details as clearly as possible. My hope was to provide enough background information on these topics that the participants of the short-course might be prepared to comprehend the current research articles. In reality, I was far from reaching my goal, and so in 1981 when I was approached by the Science Press to publish the lecture notes, I decided to rewrite them. The final result comprises the present book, which contains fewer topics but more detailed and complete description of each.

This book is intended to prepare the readers for theoretical studies in dense matter physics. It may also be used pedagogically as an introduction to the many-body theory with emphasis on illustrative examples. Many mathematical operations needed for this field are carried out in details, usually not in the most elegant way but in a practitioner's way, so that readers who are handicapped in background training can still follow. Hopefully this book will enable more newcomers to enter into the study of dense matter.

I wish to thank my colleagues at the Beijing Normal University for comments and helpful suggestions on the contents of this book. Among them I wish to mention the following persons: Liang Shao-rong, Li Zong-wei, Gao Shang-hui, Ge Yun-zao and Shi Tian-yi, whom I had the pleasure to work with during the preparation of this book. Finally, I wish to thank Chen Chung-kuang of the Graduate School of the Academy of Sciences for arranging with the Science Press for me to publish this book.

Y.C. Leung

N. Dartmouth, Massachusetts

May 4, 1983

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