# PLASMA

## THE FOURTH STATE OF MATTER

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# Foreword

The idea for this book originated with the late Igor Vasil'evich Kurchatov. He suggested to the author the need for a comprehensive presentation of the fundamental ideas of plasma physics without complicated mathematics. This task has not been an easy one. In order to clarify the physical nature of plasma phenomena without recourse to intricate mathematical expressions it is necessary to think problems through very carefully. Thus, the book did not come into being by inspiration, but required a considerable effort.

The aim of the book is to provide a beginning reader with an elementary knowledge of plasma physics. The book is primarily written for engineers and technicians; however, we have also tried to make it intelligible to the reader whose knowledge of physics is at the advanced-freshman level. To understand the book it is also necessary to have a working knowledge of electricity and magnetism of the kind available in present-day programs in junior colleges.

This book is not intended for light reading. It is designed for the reader for whom plasma physics will be a continuing interest. We have confidence that such a reader will want to broaden his knowledge by consulting more specialized literature. Thus, we not only include simple expressions but also special important terms.

Every scientific discipline has its own language. Before undertaking a journey we must acquire a knowledge not only of

the geography, but also of the language of the country we intend to visit. It is equally important in the journey to new regions of knowledge that some familiarity with its special language be acquired. Thus, every new term is emphasized (by expansion) when it first appears.

In the American edition of this book we will use the rationalized MKS system of units, which has become increasingly popular in science and engineering in recent years.

The physics of plasmas is a field in which knowledge is expanding rapidly. The size of this book does not allow us to cover everything we should. To mention the work of only some of the workers in this field would be an injustice to the others. Thus, we have decided not to give references or names, except where the names appear in scientific terminology.

The growing science of plasmas excites lively interest in many people with various levels of training. We hope, therefore, that the book will be useful to a broad range of readers.

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