

Preface

The book is based on lectures for students specializing in high energy physics delivered by the author in Cracow over several years. It aims to present the physics of relativistic heavy ions, also called the relativistic nuclear physics. This field, only some thirty years old, is a highly interesting one, as collisions of relativistic heavy ions are believed to lead to the formation of a new state of matter — the quark-gluon plasma (QGP), thus bridging frontiers between nuclear and hadronic physics.

Only well established experimental results are presented in this book. The plots shown are not necessarily the most recent ones, they have been selected for their clarity, and for presenting well the main features of experimental data. Some recent results bearing large errors which do not show the trend of the data in an unambiguous way have not been included. For the same reason, in some cases plots carrying the label “preliminary” have been used if the “final” version could not be found, or if the new presentation of the same data was not so clear, e.g. data points were obscured by some curves resulting from theoretical calculations which we do not pretend to discuss in details. It is commonly known that in most cases the “final” corrections and refinements do not change trends of the data in an appreciable way.

On the theory side, apart from a chapter devoted to Quantum Chromodynamics (QCD), only simple theoretical ideas and phenomenological models which are well supported by experimental data are briefly discussed, without going too deep into the underlying mathematical formalism. Much care has been taken in the clarity of the presentation, to make the experimental results understandable using simple conjectures, and to show connection between various aspects of the data. Some recent ideas concerning the quark-gluon plasma, and a selection of predictions for nuclear

collisions expected soon in the Large Hadron Collider at CERN complete the book.

We hope that the book will be appreciated by students and young researchers becoming involved in physics of relativistic nuclei, as well as by those looking for a comprehensive and up-to-date review of the field.

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