

# Preface

This book grew out of a three-day international workshop, *Recent Progress in Induction Accelerators*, which was held at KEK October 29–31, 2002. The original concept was to produce a book which dealt with the principles and applications of modern induction accelerators in a comprehensive manner – including developments which had occurred in the past decade. Unique distinguishing features of induction accelerators, such as the low impedance and the pulse operation are fully described. Emphasis is placed on aspects of induction accelerators that are distinct from RF accelerators including issues associated with the transport of bright, high-intensity beams. All aspects of modern induction accelerators are covered including both linear and circular geometry machines for electrons, protons, and heavy-ions.

The authors of this book were invited from a select list of active experts in the field including the workshop attendees. It is written both as a reference for graduate students and researchers. Introductory material is presented that should aid newcomers wanting a thorough and systematic introduction to the principle of induction acceleration as well as pulsed power technology supporting induction accelerators, beam dynamics, and unique induction accelerator applications. Needs of more experienced physicists and engineers involved in the design or operation of accelerator facilities are also covered. Beam dynamics material presented can be applied to both RF accelerators as well as induction accelerators.

Material presented is organized such that the first six chapters provide an introduction to the essential features of induction accelerators at a level appropriate for students and researchers new to the field. Key technologies necessary to realize a modern induction accelerator are covered in these chapters. Subsequent chapters deal with more specialized and advanced topics. Chapters 7 and 8 cover electron linacs and their applications, whereas Chaps. 9 and 10 cover ion accelerators and their applications. Chapters 11 and 12 are devoted to circular hadron induction machines. Beam physics applicable to both RF and induction accelerators is systematically developed in Chaps. 7, 9, and 11. SI units are used throughout the book except where noted otherwise.

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Michishita assisted in assembling the  $\text{\LaTeX}$  input, editing, and figure processing for the book at KEK. Prabir Roy carried out preliminary  $\text{\LaTeX}$  conversions of several chapters. Numerous other colleagues graciously contributed to the examples and figures presented and provided valuable guidance and insights. The chapters benefited from reviews and comments provided by the following colleagues: Roger Bangerter, Tom Fessenden, Alex Friedman, Antatoly Krasnykh, Joe Kwan, Grant Logan, Art Molvik, Peter Seidl, and Will Waldron. Finally, our editor Dr. Christian Caron and his team from Springer Verlag including Gabriele Hakuba were patient and provided valuable help and encouragement.

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Ken Takayama

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Takayama, K.; Briggs, R.J. (Eds.)

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