

Preface

During the past decades the field of *quantum information* processing has experienced extremely rapid progress. This book provides an introduction to the main ideas and techniques of the rapid progressing field of quantum information and quantum computation using *isotope-mixed* materials. This book is divided into four chapters. [Chapter 2](#) presents the introduction to the physics of isotope effect in solids. My goal here is to give an elementary introduction which is accessible not only to physics, but also to mathematicians and computer scientists desiring an initiation into subject. In this chapter isotope *low-dimensional structures* are very shortly described. The reader might understand the material presented in this chapter without the need for consulting other texts. [Chapter 3](#) is devoted to the description of classical and quantum information. The rest of the chapter has presented the concepts and models of quantum computers. There are discussed not only different algorithms of quantum computation but also are presented the different models of *quantum computers*. The quantum error corrections is very briefly discussed. We did not attempt to make our small book self-contained by explaining every concept which is needed only occasionally. We do hope, however, that we have succeeded in explaining the basic concepts from quantum mechanics and computer science which are used throughout the book and the whole field of quantum information and *quantum computation*.

With numerous illustrations this small book will be of great interest to undergraduate and graduate students taking courses in *mesoscopic* physics or nano-electronics as well as quantum information, and academic and industrial researchers working in this field.

The bibliography at the end of the each chapter includes many of the key papers in the area and points to other books and survey papers on the subject.

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