

Preface

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The quantum information processing is a new research area at the borderline between the quantum physics and computer science. The main goals of this field are the extension of the limits of applicability of the classical computers and the derivation of improved classical complexity bounds as well as of cryptographic communication protocols making use of quantum mechanical phenomena. At the same time, the investigation of the resources of the quantum computation (such as the quantum entanglement) allows us to understand some basic topics of the quantum mechanics from a different point of view. The recent advances in the realization of qubits and elementary quantum logic gates using ion traps, QED cavities, NMR technologies, quantum optical systems, superconducting

devices and solid state nanostructures open new perspectives in the quantum information processing. The achievement of the control of phenomena such as the quantum teleportation, the entangled exchange or the quantum cloning, and, obviously, of the quantum switch, have resulted in an extensive exploration of this field by scientists coming from different branches of research. The purpose of the Workshop was to provide a comprehensive overview of some recent advances in the quantum information theory and to establish fruitful contacts for future collaboration. The main topics of the Workshop cover several aspects of this rapidly developing research area.

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