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PREFACE

Quantum information processing is a new research area at the intersection of quantum physics and computer science. The main goal of this field is to improve on classical computers and classical complexity bounds as well as cryptographic communication protocols by making use of quantum mechanical phenomena. Simultaneously, investigation of resources for quantum computation (such as quantum entanglement) enables us to understand from a different perspective the fundamental properties of quantum mechanics. Recent advances in the realization of elementary quantum logic gates (e. g., using ions traps, cavity QED and NMR technology), and the experimental implementation of phenomena such as quantum teleportation, entanglement swapping or quantum cloning, and, obviously, experimental implementation of quantum key distribution have led to a massive exploration of this field by scientists from varied disciplines. The purpose of the Workshop is to provide a compact and comprehensive overview of basic ideas of quantum information theory and to establish perspective contacts for future collaboration. Main topics of the Workshop should cover entanglement as a resource for quantum computing and communication, multipartite quantum correlations, decoherence, physics of information processing, and others.

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