PREFACE

Contributions to the present volume are based on talks delivered at the Banach Center Symposium on "Geometry and Topology of Caustics *CAUSTICS '02*" organized in Warsaw from 17 till 29 June 2002. This Symposium continued a long tradition of conferences and semesters on singularity theory at the Banach Center starting from S. Łojasiewicz Semester on Singularities in 1985 and followed the first Banach Center Symposium on "Geometry and Topology of Caustics *CAUSTICS '98*" organized in 1998. All the years the Banach Center was a meeting place between scientists from all over the world and the good atmosphere, scientific and social contact, resulted in exchange of modern mathematical ideas on a high level. In the field of Singularity Theory with the good Polish tradition this was especially a meeting place between well-known groups of Eastern and Western Europe.

The domain of Singularity Theory is on the crossroad between many fields of recent mathematics and its applications. The elementary point of view of studying the way that phenomena change when they depend on parameters is still very fruitful. Due to pioneers as R. Thom, V. I. Arnol'd, J. Mather one considers the space of all possible states and distinguishes the generic phenomena from the non-generic ones. These last cases form the bifurcation set or caustic. Due to transversality assumptions one can reduce the process to study finite-dimensional models of structural changes with a deep insight into the subtle properties of singular objects. The Symposium brought together researchers from several different areas of contemporary research also in differential geometry and topology, singularity theory, symplectic geometry, mathematical physics, experimental physics and chemistry and nonlinear phenomena.

The topics and new directions discussed during the Symposium include

 I. Local models
 — Lagrangian and legendrian singularities
 — Asymptotic behaviour around caustics and wavefronts
 — Singular symplectic, contact and Poisson spaces
 — Systems of rays, optical caustics
 — Bifurcations of caustics and wavefronts
 — Singularities of J-holomorphic curves

II. Symplectic invariants
 — Vassiliev invariants, Gromov-Witten invariants

— Lagrangian cobordism invariants
— Symplectic capacities
— Singular reduction, Hamiltonian systems
— Applications to physical systems and control theory.

Approximately 50 scientists participating in the meeting came from 11 countries, among them many young mathematicians. We would like to mention especially one, very active and inspiring participant of the Symposium, who passed away in November 2002. This is Peter Slodowy. We devote this volume to his memory. Over more than 30 years he was an outstanding mathematician, a good friend of many of us, always brilliant, optimistic and helpful.

The Symposium was supported by the Centre of Excellence (CE package 7) European Community program realized in the Institute of Mathematics Polish Academy of Sciences, and by the State Committee for Scientific Research (KBN). The editors would like to express their gratitude to all these institutions and Banach Center Council for their support.

Stanisław Janeczko, Dirk Siersma