

Preface

The Ginzburg-Landau equation is a nonlinear partial differential equation which was proposed around 1950 as a mathematical model of superconductors. Since then, it has become an extremely useful tool in many areas of physics where vortices carrying a topological charge appear. Following the publication of the monograph by Bethuel-Brézis-Hélein in 1994, there has been remarkable progress in the mathematical understanding of this equation. This involves a combined use of mathematical tools from many branches of mathematics such as nonlinear partial differential equations, geometric measure theory and harmonic maps in differential geometry. The Ginzburg-Landau model has been an amazing source of new problems and new ideas in analysis, geometry and topology. As a result, it has been of great interest to more and more mathematicians.

The “Ginzburg-Landau Vortices” School and Symposium, organized jointly by the Sino-French Institute of Applied Mathematics (ISFMA) and the International Center of Pure and Applied Mathematics (CIMPA), was held during November 18-29, 2002 in Fudan University, Shanghai, China. Over 70 teachers and graduate students from China (including Taiwan) and Philippines took part in the School and Symposium. 4 specialists taught 4 courses of 40 hours in total and 6 participants reported their own research results on the Symposium. We have collected the contents of these courses and related research results into the present volume, hoping that it will meet the urgent needs of the specialists, scholars and graduate students working in this area or related areas. We also use this occasion to express our admiration to Professor Vitaly Ginzburg who won the 2003 Nobel Prize in Physics for his outstanding contributions to the theoretical research of phase transition and superconductivity, and in particular for introducing the above mentioned model.

The editors would like to take this opportunity to express their sincere thanks to all authors in this volume for their supports; to the French Embassy in Beijing, the Consulate General of France in Shanghai, the

National Natural Science Foundation of China, the Mathematical Center of Ministry of Education of China, Higher Education Press and Fudan University for their supports and financial aid; to Professor Luis Almeida for helping with the organization and also to Professor Cai Zhijie and Professor Xue Mi for their efficient assistance in editing this book.

July 2004

Haim Brezis Tatsien Li