

Preface

This book explains how to describe quantum effects in mesoscopic systems by semiclassical methods. These methods combine on the one hand concepts of classical mechanics as classical trajectories and on the other hand of quantum mechanics as interference effects. By this they are especially suited to describe the transition region between the macroscopic and the microscopic world, i.e. the mesoscopic regime. Within the semiclassical framework *classical* orbits alone can lead to a basic understanding of quantum effects, e.g. of quantum spectra. However for a full understanding *quantum* interference between different paths need to be taken into account. These attracted huge interest during the last years. We thus want to review here the most important developments and present recent advances.

The content of this book originates from my Ph.D. thesis *Semiclassical Approach to Mesoscopic Systems: Classical Trajectory Correlations and Wave Interference* at the Institute for Theoretical Physics at the University of Regensburg in 2011. This work was supervised by Prof. Klaus Richter. Him I would like to thank for his guidance and encouragement during the last years.

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