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PREFACE

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Recent years have witnessed novel and exciting advances on the subject of optical coherence and collective phenomena in nanostructures. This volume overviews the forefront progress in this area, collecting nine reviews and ten new contributions by leading experts in the field. The subfields included in this volume span from two-dimensional electron gases, semiconductor excitons, coupled quantum wells, microcavity polaritons, quantum dots and quantum wires.

One of the most exciting directions in coupled quantum wells is the possibility to explore novel quantum fluid phases of indirect excitons and the formation of spontaneous coherence. Strong light-matter interaction in semiconductor microcavities has lead to the ability of controlling, manipulating and detecting the matter properties by all optical means. Structures with reduced dimensionality, such as quantum dots and quantum wires, offer the possibility to explore novel physics and new applications for nanoscience technology. Finally, recent advances in probing and controlling spin and charge dynamics in two-dimensional electron gases open new perspectives towards spintronics. The intellectual and applied links between all these problems offer fascinating opportunities for further advances in this field.

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