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FOREWORD

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For over 25 years, studies on one-dimensional transport phenomena in semiconductors have been carried out: first in silicon, then in gallium arsenide and presently in numerous other materials. These studies have provided an extremely effective means to investigate a broad variety of mesoscopic and nanoelectronic phenomena. In the ballistic (point contact) regime these structures show excellent examples of quantized conductance in integer units of the fundamental quantum of conductance, $2e^2/h$. For a long time this has been understood to arise from the almost perfect transmission of one-dimensional subbands. On the other hand, the origin of the 0.7 structure, an additional plateau-like feature that occurs ubiquitously at a conductance value close to $0.7 \times 2e^2/h$ remains undetermined. Interest in the 0.7 structure, which is now approaching its twelfth year, is helping to raise awareness of the interesting effects that can be observed in semiconductor nanostructures, and also the versatility of these devices. The 0.7 structure has been apparent from the earliest days of one-dimensionality and its remarkable persistence in both published and unpublished data has led to detailed investigations and the finding that it is clearly related to electron spin. It has now been observed in a variety of one-dimensional systems and investigations have widened to include spin effects and the consequences of electron interaction in general. The effect has also stimulated theorists with many explanations being proposed. This has taken the theory into new areas, which in turn has led to new experiments.

When a special issue devoted to the 0.7 structure was first proposed, the level of interest that it would generate was unclear. However, the scientific community's enthusiasm for the idea, and significant interest from authors, were extremely gratifying. We must express our thanks to all of the authors for their cooperation and help in preparing their articles on time. It is hoped that this special issue will help convey, to a wide audience, the opportunities that modern semiconductor technology brings to the study of nanostructures and the flexibility which exceeds by far that achieved in other systems. These systems are outstanding laboratories of quantum solid state physics and their full potential is yet to be realised.

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