New Physics at the Nanoscale

2007 J. Phys.: Condens. Matter 19 440301

(http://iopscience.iop.org/0953-8984/19/44/440301)

INSTITUTE OF PHYSICS PUBLISHING JOURNAL OF PHYSICS: CONDENSED MATTER

J. Phys.: Condens. Matter **19** (2007) 440301 (2pp) doi:10.1088/0953-8984/19/44/440301

PREFACE

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Advancements in technology have led to the continual reduction in the size and cost of new devices whilst increasing their capacities and capabilities. To keep up with the rate of these advancements, scientists recognize the need to further understand and take advantage of the new physics at the nanoscale. This special issue of *Journal of Physics: Condensed Matter* is a compilation of research dedicated to this topic.

There are a total of ten articles in this volume. The first three articles are investigations on the formation at the nanoscale of an SrF_2 insulator monolayer on Si(111), nanoporous structures in Ge surfaces, and ultra-small carbon nanotubes formed in zeolite crystal channels. The next two articles discuss new findings on perylene diamide dendrimers and silicon nanocrystals, and are followed by studies on the opticall/electronic properties and spin relaxation in quantum dots. The next two articles provide the necessary theoretical frameworks for phenomena applicable at the nanoscale. Last, but not least, is an article on the computational design of novel nanomaterials for catalytic applications.

This special issue is not intended to be a comprehensive collection of the current state of research at the nanoscale. However, we do hope that by incorporating a balanced variety of subject matters—ranging from formation, optical, electronic and spin properties, theoretical framework to design of nanomaterials—the readers will gain a good overview and even greater fascination for this new and diverse field of physics.

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