

Personal perspectives in the physical sciences for the Royal Society's 350th anniversary

PAPERS OF A THEME ISSUE COMPILED AND EDITED BY
MICHAEL PEPPER

CONTENTS

Preface

M. REES

Celebrating 350 years of the Royal Society 909

Editorial

M. PEPPER

Editor's Introduction to 'Personal perspectives in the physical sciences
for the Royal Society's 350th anniversary' 911

Articles

M. ATIYAH, R. DIJKGRAAF AND N. HITCHIN

Geometry and physics 913

S. M. BARNETT AND R. LOUDON

The enigma of optical momentum in a medium 927

P. P. EDWARDS, M. T. J. LODGE, F. HENSEL AND R. REDMER

'... a metal conducts and a non-metal doesn't' 941

R. S. ELLIS

Gravitational lensing: a unique probe of dark matter and dark energy 967

N. T. ROSS, W. P. KATT AND A. D. HAMILTON

Synthetic mimetics of protein secondary structure domains 989

J. S. HIGGINS, J. E. G. LIPSON AND R. P. WHITE

A simple approach to polymer mixture miscibility 1009

C. HILSUM

Flat-panel electronic displays: a triumph of physics, chemistry and
engineering 1027

M. J. KELLY

Energy efficiency, resilience to future climates and long-term
sustainability: the role of the built environment 1083

| | |
|--|------|
| C. LLEWELLYN SMITH AND S. COWLEY | |
| The path to fusion power | 1091 |
| R. A. MARCUS | |
| Interaction of theory and experiment: examples from single molecule studies of nanoparticles | 1109 |
| D. NOBLE | |
| Biophysics and systems biology | 1125 |
| K.-F. BERGGREN AND M. PEPPER | |
| Electrons in one dimension | 1141 |
| E. K. H. SALJE | |
| Multi-scaling and mesoscopic structures | 1163 |
| D. SHERRINGTON | |
| Physics and complexity | 1175 |
| A. H. ZEWAIL | |
| <i>Micrographia</i> of the twenty-first century: from <i>camera obscura</i> to 4D microscopy | 1191 |