

PROCEEDINGS OF  
THE ROYAL SOCIETY  
OF LONDON

SERIES A

VOLUME 333

MATHEMATICAL AND PHYSICAL SCIENCES

1973

PUBLISHED BY THE ROYAL SOCIETY  
6 CARLTON HOUSE TERRACE LONDON SW1Y 5AG

The four numbers in this volume can be obtained separately from the Royal Society, 6 Carlton House Terrace, London SW1Y 5AG.

# CONTENTS

## SERIES A VOLUME 333

NUMBER 1592 17 APRIL 1973

Rydberg series and autoionization resonances in the Sc I absorption spectrum. By W. R. S. Garton, F.R.S., E. M. Reeves, F. S. Tomkins and B. Ercoli (Plates 1 and 2)	page 1
Rydberg series and autoionization resonances in the YI absorption spectrum. By W. R. S. Garton, F.R.S., E. M. Reeves, F. S. Tomkins and B. Ercoli (Plates 3 and 4)	17
Free convection effects on the oscillatory flow past an infinite, vertical, porous plate with constant suction. I. By V. M. Soundalgekar	25
Free convection effects on the oscillatory flow past an infinite, vertical, porous plate with constant suction. II. By V. M. Soundalgekar	37
Molecular-sieve type sorption on alkali graphite intercalation compounds. By K. Watanabe, T. Kondow, M. Soma, T. Onishi and K. Tamaru	51
The symmetric group and the method of diatomics in molecules: an application to small lithium clusters. By B. T. Pickup	69
Model-independent aspects of tracer chromatography theory. By B. A. Buffham	89
The shear strength of thin lubricant films. By B. J. Briscoe, B. Scruton and F. R. Willis (Plate 5)	99
Unsteady convective diffusion with interphase mass transfer. By R. Sankarasubramanian and W. N. Gill	115

NUMBER 1593 1 MAY 1973

Review Lecture. The prevention of metal breakouts through refractories. By J. H. Chesters, F.R.S. (Plates 6 to 9)	133
The momentum of a light wave in a refracting medium. By M. G. Burt and Sir Rudolf Peierls, F.R.S.	149
Perturbation theory for projected states. By Sir Rudolf Peierls	157
The photoelectron spectra of thiocarbonyl fluoride and thiocarbonyl chloride. By G. W. Mines, R. K. Thomas and Sir Harold Thompson, F.R.S.	171
Mechanisms of compaction of powdered materials. By J. S. Hardman and B. A. Lilley (Plates 10 and 11)	183
The theoretical description of ionic states observed by high energy photoelectron spectroscopy. By M. F. Guest, I. H. Hillier, V. R. Saunders and M. H. Wood	201
Introduction of internal coordinates into the infinite-component Majorana equation. By A. O. Barut and I. H. Duru	217

The rôle of d functions in the Si—N bond. By P. Baybutt, M. F. Guest and I. H. Hillier	page 225
The thermal expansion of alkali halides at low temperatures. II. Sodium, rubidium and caesium halides. By G. K. White and J. G. Collins	237
Comments on the article: 'The two-fluid model of the helium film'. By D. J. Bergman	261

## NUMBER 1594 26 MAY 1973

Microwave spectroscopy of nonlinear free radicals. I. General theory and application to the Zeeman effect in HCO. By I. C. Bowater, J. M. Brown and A. Carrington, F.R.S.	265
Vibrational relaxation in the triplet state. By S. J. Formosinho, Sir George Porter, F.R.S. and M. A. West	289
On the transport of compact particles through solutions of chain-polymers. By A. G. Ogston, F.R.S., B. N. Preston and J. D. Wells. <i>With appendices</i> <i>by A. G. Ogston, F.R.S., by B. N. Preston &amp; J. McK. Snowden and by</i> <i>J. D. Wells</i>	297
Representations of the Bondi–Metzner–Sachs group. II. Properties and classification of the representations. By P. J. McCarthy	317
Two theoretical models of fatigue crack propagation. By L. N. McCartney and B. Gale	337
The solution of heat transfer problems by the Wiener–Hopf technique. I. Leading edge of a hot film. By S. G. Springer and T. J. Pedley	347
Interatomic forces in hexamethylenetetramine. By G. Dolling, G. S. Pawley and B. M. Powell	363
The effect of temperature, pressure, and excitation wavelength on the photoluminescence of acetaldehyde vapour. By A. S. Archer, R. B. Cundall, G. B. Evans and T. F. Palmer	385

## NUMBER 1595 29 JUNE 1973

Long range forces and broken symmetries. By P. A. M. Dirac, F.R.S.	403
Monte-Carlo simulation of hydrogen-atom recombination. By A. Jones and J. L. J. Rosenfeld	419
The wear of diamond. By D. Crompton, W. Hirst and M. G. W. Howse (Plates 12 to 17)	435
The crystallography and nucleation of pearlite. By R. J. Dippenaar and R. W. K. Honeycombe (Plates 18 to 25)	455
On nonlinear Ekman and Stewartson layers in a rotating fluid. By D. A. Bennetts and L. M. Hocking	469
Axial flow in laminar trailing vortices. By D. W. Moore and P. G. Saffman	491
Indexes	509