AUSTRALIAN JOURNAL OF PHYSICS

VOLUME 7

MELBOURNE 1954

AUSTRALIAN JOURNAL OF PHYSICS

Published by the Commonwealth Scientific and Industrial Research Organization, in collaboration with the Australian National Research Council and the Institute of Physics (Australian Branch), and under the general direction of the Editorial Board (Dr. N. S. Noble (Chairman), Professor J. S. Anderson, Professor Sir Macfarlane Burnet, Professor L. H. Martin, and Professor J. G. Wood). Volumes 1 to 5 of the Australian Journal of Physics and the Australian Journal of Chemistry issued as the Australian Journal of Scientific Research, Series A: Physical Sciences.

Issued quarterly, 30/- per annum

EDITORIAL ADVISORY COMMITTEE

Chairman and Editor: Dr. N. S. Noble

Members: Dr. G. H. Briggs

Professor L. H. Martin Professor H. C. Webster

All enquiries and manuscripts should be forwarded to:

The Editor,
Australian Journal of Physics,
Commonwealth Scientific and Industrial Research Organization,
314 Albert Street, East Melbourne, C.2, Victoria.

Printed by Australasian Medical Publishing Co. Ltd., Sydney.

CONTENTS

Number 1, March 1954

An Interpretation of the Field Tensor in the Unified Field Theory. By N. W. Taylor	
Twisted Magnetic Fields in Conducting Fluids. By J. W. Dungey and R. E. Loughhead	
On a Theory due to I. Fényes By A. F. Nichelson	
Some Electron Collision Cross Sections of CaII. By J. T. Jefferies	
The Continuous Radiative Absorption Cross Section of FeXIV and the Coronal Temperature. By Alma Werner	
Space Charge Wave Amplification in a Shock Front and the Fine Structure of Solar Radio Noise. By Hari K. Sen	
On the Criterion for Dielectric Breakdown in Ionic Crystals. By J. J.	
The Integral and Differential Range Spectra of Sea-level Mesons. By	
The Lattice Component of the Thermal Conductivity of Metals and Alloys. By P. G. Klemens	
The Thermal Conductivity of Pure Metals at Low Temperatures According	
to the Free Electron Theory. By P. G. Klemens 64	
The Electrical and Thermal Conductivities of Monovalent Metals. By P. G. Klemens	
X-ray Line Broadening and Pure Diffraction Contours. By R. I. Garrod, J. F. Brett, and J. A. Macdonald	
Galactic Radiation at Radio Frequencies. VII. Discrete Sources with Large Angular Widths. By J. G. Bolton, K. C. Westfold, G. J. Stanley, and O. B. Slee	
Galactic Radiation at Radio Frequencies. VIII. Discrete Sources at 100 Mc/s between Declinations +50° and -50°. By J. G. Bolton,	
Observations of the General Background and Discrete Sources of 18.3 Mala	
Cosmic Noise. By C. A. Shain and C. S. Higgins 130	
A Comparison of the Intensities of Cosmic Noise Observed at 18·3 Mc/s and at 100 Me/s. By C. A. Shain	
High Multiple Radio Reflections from the F ₂ Layer of the Ionosphere at Brisbane. By K. Baird	
Convection from a Large Horizontal Surface. By C. H. B. Priestley 176	
Vertical Heat Transfer from Impressed Temperature Fluctuations. By C. H. B. Priestley	
Deviations from Matthiessen's Rule for Cold-drawn Wires. By G. J. Ogilvie and W. K. Clothier	

Number 2, June 1954

P	AGE
The Multiple Scattering of Electrons and Positrons. By C. B. O. Mohr and L. J. Tassie	217
Recent Studies of Chromospheric Spicules. By J. H. Rush and W. O. Roberts	230
On the Choice of Glasses for Cemented Achromatic Aplanatic Doublets. By W. H. Steel	244
On the Optical Properties of Components for Birefringent Filters. By R. G. Giovanelli and J. T. Jefferies	254
Dipole Resonant Modes of an Ionized Gas Column. By R. E. B. Makinson and D. M. Slade	268
The Decay of the 7.68 MeV State in ¹² C. By R. G. Uebergang	279
The Response of a Sodium Iodide Scintillation Counter to 18 MeV γ -Radiation. By J. G. Campbell and A. J. F. Boyle	284
The Measurement and Reduction of Distortion in Thick Emulsions. By V. D. Hopper, Y. K. Lim, and Madeline C. Walters	288
Observations of the 21 cm Line from the Magellanic Clouds. By F. J. Kerr, J. F. Hindman, and B. J. Robinson	297
The Barometer Coefficient and Air Mass Effects on Cosmic Rays at Macquarie Island. By R. M. Jacklyn	315
An Investigation of Finite Strain in an Isotropic Material Subjected to Hydrostatic Pressure and its Seismological Applications. By A. Keane	322
On the Secular Variation of Rainfall at Adelaide. By E. A. Cornish	334
Short Communications	
The Capacitance of an Anchor Ring. By T. S. E. Thomas	347
On the Photodisintegrations $^6\text{Li}(\gamma,d)^4\text{He}$ and $^6\text{Li}(\gamma,t)^3\text{He}$. By E. W. Titterton and T. A. Brinkley	350
Delayed Disintegration of Heavy Fragments. By Francoise A. Brisbout and V. D. Hopper	352
Comments on a Paper by E. G. Bowen entitled "The Influence of Meteoritic Dust on Rainfall". 1. By W. C. Swinbank	354
Comments on a Paper by E. G. Bowen entitled "The Influence of Meteoritic Dust on Rainfall". 2. By D. F. Martyn	f . 358
Corrigendum	364

CONTENTS

Number 3, September 1954

On the Coulomb and Hulthén Potentials. By S. T. Ma	PAGE 365
Electron Screening and Thermonuclear Reactions. By E. E. Salpeter	373
Optical Diffraction Effects Produced by Amplitude and Phase Changes in the Wave Front. By G. H. Godfrey	389
The Influence of the Cathode Material on Measured Breakdown Strengths of Solid and Liquid Dielectrics. By J. J. O'Dwyer	400
The Residual Range of Delayed Particles in Extensive Air Showers. By V. C. Officer and P. J. Eccles	410
Momentum Distribution and Charge Ratio of μ -Mesons at Zenith Angles in the East-West Plane. By J. R. Moroney and J. K. Parry	423
Harmonics in the Spectra of Solar Radio Disturbances. By J. P. Wild, J. D. Murray, and W. C. Rowe	439
Observations of Cosmic Noise at 9·15 Mc/s. By C. S. Higgins and C. A. Shain	460
The Association of Pulsating and Flaming Auroras with Complete Ionospheric Absorption at Macquarie Island. By G. Major	471
Variations of Intensity of the Aurora at Macquarie Island. By F. Jacka	477
Programme Design for the C.S.I.R.O. Mark I Computer. III. Adaptation of Routines for Elaborate Arithmetical Operations. By T. Pearcey	
and G. W. Hill	485
The Effect of Interpretive Techniques on Functional Design of Computers. By T. Pearcey, G. W. Hill, and R. D. Ryan	505
Short Communications	
The Contribution of Phonons to the Thomson Coefficient. By P. G. Klemens	520
Fluctuations of Long-Period Accumulations of Daily Rainfall Amounts. By J. Neumann	522
Polarization of Bremsstrahlung. By E. G. Muirhead and K. B. Mather	527

Number 4, December 1954

	PAGE
The Multivariate t-Distribution Associated with a Set of Normal Sample Deviates. By E. A. Cornish	531
The Angular Distribution of High Energy Electrons in Air Showers. I. Landau Approximation. By M. H. Kalos and J. M. Blatt	543
The Albedo for the Atomic Scattering of Optical Radiation. By R. G. Giovanelli and J. T. Jefferies	570
The Emission of Radiation from Model Hydrogen Chromospheres. II. By J. T. Jefferies and R. G. Giovanelli	574
The Multiple Scattering of Protons in Nuclear Emulsions. By J. R. Bird and K. C. Hines	586
Measurements of the Cosmic Ray Neutron Rate in the Himalayas and Australian Alps. By K. B. Mather	
Aerial Smoothing in Radio Astronomy. By R. N. Bracewell and J. A. Roberts	615
The Attenuation of Light by Meteoric Dust in the Upper Atmosphere. By R. G. Giovanelli	0.44
Short Communications	
Sea Surface Temperatures. By F. K. Ball	649
Microinterferometric Examination of Nuclear Emulsion Plates. By B. S. Thornton	
The Noise Generated in a Coil with a Ferromagnetic Core. By G. Builder and D. Haneman	2 - 1
Scattering of 4.9 MeV Protons by ²⁷ Al. By K. B. Mather	658
Index to Volume 7	661