
Australian Journal of Physics

Volume 30

Melbourne 1977

Australian Journal of Physics

A medium for the publication of results of original scientific research in all branches of physics.

Compilations of astrophysical data are published at irregular intervals in Astrophysical Supplements to the Journal.

Board of Standards

The Board of Standards for this Journal is appointed by the Commonwealth Scientific and Industrial Research Organization and the Australian Academy of Science and consists of:

L. T. Evans (Chairman)
S. J. Angyal
M. J. P. Canny
R. W. Crompton
G. A. Horridge
L. G. Paleg
A. J. Pittard
J. P. Quirk
B. J. Robinson (from 1 September 1977)
D. J. Rochford
D. E. Tribe
H. R. Wallace
J. P. Wild (until 31 August 1977)
B. J. Walby (Editor-in-Chief)

Advisory Committee

Acceptance of papers for this Journal is in the hands of an Advisory Committee consisting of a Chairman appointed by the Executive of CSIRO and the Council of the Australian Academy of Science, and members appointed by the Board of Standards in consultation with the Australian Institute of Physics.

R. W. Crompton (Chairman)
D. J. Newman
J. H. Piddington
B. M. Spicer
L. J. Tassie
B. J. Walby (*ex officio*)

Published in Melbourne for the Commonwealth Scientific and Industrial Research Organization and the Australian Academy of Science under the editorial control of D. E. Boyd and T. W. Clarke.

Issued six times a year.

Annual subscription \$A25 per annum.

Australian Journal of Physics

© CSIRO 1977

All enquiries and manuscripts should be forwarded to:

The Editor-in-Chief
Editorial and Publications Service
CSIRO, P.O. Box 89
East Melbourne, Victoria 3002

Australian Journal of Physics

Contents Volume 30 Number 1 February 1977

- Field theory of particles with arbitrary spin. *H. S. Green* 1
- A numerical solution of wave equations for real or complex eigenvalues.
E. Clayton and G. H. Derrick 15
- Angular correlation measurements in ^{33}S . *J. R. Southon, A. R. Poletti and D. J. Beale* 23
- An improved calculation of the multiphoton bremsstrahlung process in the presence of a laser beam. *Rama Acharya and Man Mohan* 33
- Drift velocities of low energy electrons in argon at 293 and 90 K.
A. G. Robertson 39
- The ratio of the lateral diffusion coefficient to mobility for electrons in argon at 294 K. *H. B. Milloy and R. W. Crompton* 51
- The momentum transfer cross section for electrons in argon in the energy range 0–4 eV. *H. B. Milloy, R. W. Crompton, J. A. Rees and A. G. Robertson* 61
- On the validity of the two-term approximation in the solution of Boltzmann's equation for electron motion. *H. B. Milloy and R. O. Watts* 73
- Monte Carlo simulation of electron swarms in H_2 . *S. R. Hunter* 83
- Short Communications**
- Mean square vibration amplitudes in zinc. *D. W. Field* 105
- Plane symmetric solutions of a scalar-tensor theory of gravitation.
D. R. K. Reddy 109

Australian Journal of Physics

Contents Volume 30 Number 2 April 1977

2^- states of ${}^8\text{Be}$. *F. C. Barker* 113

Evidence for two-step processes in photonuclear reactions. *B. M. Spicer* 127

Vibrational excitations in the even-mass cadmium isotopes. *R. H. Spear, J. P. Warner, A. M. Baxter, M. T. Esat, M. P. Fewell, S. Hinds, A. M. R. Joye and D. C. Kean* 133

${}^{12}\text{C} + {}^{16}\text{O}$ elastic scattering and total reaction cross sections near the Coulomb barrier. *B. N. Nagorcka, G. D. Symons, P. B. Treacy and I. C. Maclean* 149

The ${}^{11}\text{B}({}^3\text{He}, n_0){}^{13}\text{N}$ reaction. *J. R. Davis and G. U. Din* 167

Cell sizes at the onset of thermal convection in a fluid layer subject to the influence of rotation and a magnetic field. *J. O. Murphy* 177

Observations of neutral hydrogen in bright southern galaxies. *J. B. Whiteoak and F. F. Gardner* 187

The Molonglo deep sky survey of radio sources. I. Declination zone -20° .
J. G. Robertson 209

The Molonglo deep sky survey of radio sources. II. Declination zone -62° .
J. G. Robertson 231

The Molonglo deep sky survey of radio sources. III. Source counts.
J. G. Robertson 241

Short Communications

On space-like geodesics in two special gravitational fields. *A. Banerjee and S. B. Dutta Choudhury* 251

Supplementary Series

Abstracts of Astrophysical Supplement Number 41: The Parkes 2700 MHz survey (twelfth part): Catalogue and new optical identifications. *J. G. Bolton, Ann Savage and Alan E. Wright* 257

Australian Journal of Physics

Contents Volume 30 Number 3 June 1977

Basic properties of the exceptional Lie groups. *B. G. Wybourne and M. J. Bowick* 259

The optical model and proton elastic scattering from ^{14}N and ^{16}O . *A. Gabric and K. Amos* 287

The effect of inelastic collisions on diffusion coefficients for electron swarms. *J. L. A. Francey and D. A. Jones* 303

Ligand ordering parameters. *D. J. Newman* 315

Properties of 2 : 2 chalcogenide crystals with sodium chloride structure. *K. P. Thakur* 325

The effect of plate oscillations on horizontal free convection flow. *R. L. Verma and Punyatma Singh* 335

Surface waves in viscoelastic media under the influence of gravity. *S. Bhattacharyya and S. N. De* 347

Short Communications

Energy dependence of the dip in pp elastic scattering and the pomeron periphery. *Mujahid Kamran and Mohammad Saleem* 355

Nuclear structure of ^{12}C from an α -particle model. *S. N. Banerjee and S. N. Chakrabarti* 361

The $^{35}\text{Ar}(\beta^+)^{35}\text{Cl}$ decay and the anomalous Cabibbo angle. *R. E. White and H. Naylor* 365

Australian Journal of Physics

Contents Volume 30 Number 4 August 1977

- Local and nonlocal potentials for low energy pion-nucleon scattering. *E. Clayton, J. L. Cook and E. K. Rose* 369
- Neutron resonance parameters of ^{90}Zr below 300 keV. *A. R. de L. Musgrove, J. A. Harvey and W. M. Good* 379
- High resolution neutron transmission and capture for ^{91}Zr . *A. R. de L. Musgrove, J. W. Boldeman, B. J. Allen, J. A. Harvey and R. L. Macklin* 391
- The chromium photoneutron cross section. *Jeanette Weise, M. N. Thompson, K. Shoda and H. Tsubota* 401
- Properties of the lowest $T = 2$ state in ^{24}Mg . *J. C. P. Heggie and H. H. Bolotin* 407
- A study of the $^{42}\text{Ca}(\text{p},\gamma)^{43}\text{Sc}$ reaction. *G. U. Din and B. Heusch* 417
- Radiative detection of single-pulse and spin-echo nuclear magnetic resonance. *G. V. H. Wilson, D. H. Chaplin, P. Cooke, H. R. Foster and P. Lynam* 461
- Generalized Ohm's laws for relativistically streaming plasmas. *R. R. Burman* 471
- Emission and absorption of Langmuir waves by anisotropic unmagnetized particles. *D. B. Melrose and J. E. Stenhouse* 481
- Mode coupling in the solar corona. III. Alfvén and magnetoacoustic waves. *D. B. Melrose* 495
- A radio study of Abell clusters. *B. Y. Mills and D. G. Hoskins* 509

Short Communications

- Solar zenith angle dependence of sudden cosmic noise absorptions. *S. B. S. S. Sarma and M. C. Sharma* 531

Australian Journal of Physics

Contents Volume 30 Numbers 5,6 November 1977

Energy-momentum tensors for dispersive electromagnetic waves.

R. L. Dewar 533

Photoproduction of pion pairs at moderate energies. *T. Chandramohan, K. Venkatesan and P. Achuthan* 577

Gamma rays from keV neutron capture in lanthanum. *M. J. Kenny and B. J. Allen* 591

Resonant neutron capture in ^{139}La . *A. R. de L. Musgrove, B. J. Allen and R. L. Macklin* 599

Resonant neutron capture in ^{45}Sc below 100 keV. *M. J. Kenny, B. J. Allen and R. L. Macklin* 605

Channelling of MeV H and He ions in alkali halides at 'zero dose' measurements. *P. B. Price and J. C. Kelly* 617

Theory of melting: thermodynamic basis of Lindemann's law. *F. D. Stacey and R. D. Irvine* 631

A simple dislocation theory of melting. *F. D. Stacey and R. D. Irvine* 641

Mode coupling in the solar corona. IV. Magnetohydrodynamic waves. *D. B. Melrose and M. A. Simpson* 647

Mode coupling in the solar corona. V. Reduction of the coupled equations. *D. B. Melrose* 661

Short Communications

Generalization of Planck's law of radiation to anisotropic dispersive media. *K. D. Cole* 671

A note on the Abraham-Lorentz equation. *George L. Murphy* 675

The photoneutron cross section of natural osmium. *Su Su, R. H. Sambell, E. G. Muirhead and B. M. Spicer* 677

Supplementary Series

Abstract of Astrophysical Supplement Number 42: Optical identifications from the Molonglo catalogues MC2 and MC3. I. Right ascensions 11^h 28^m to 17^h 00^m.
C. Hazard and H. S. Murdoch 681

Abstract of Astrophysical Supplement Number 43: Culgoora-3 list of radio source measurements. *O. B. Slee* 681

Abstracts of Astrophysical Supplement Number 44: The Parkes 2700 MHz survey (thirteenth part): Catalogue and new optical identifications. *J. G. Bolton, Ann Savage and Alan E. Wright* 681

Index to Volume 30 683