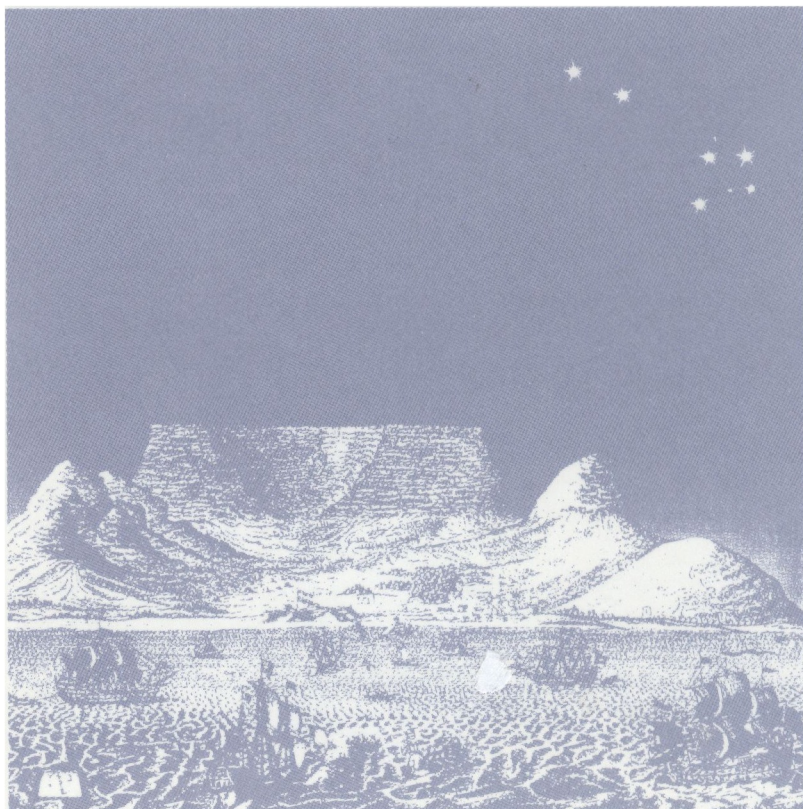




ASTROPHYSICAL APPLICATIONS OF STELLAR PULSATION



Edited by
R. S. Stobie and P. A. Whitelock

ASTROPHYSICAL APPLICATIONS OF STELLAR PULSATION

A SERIES OF BOOKS ON RECENT DEVELOPMENTS IN ASTRONOMY AND ASTROPHYSICS

**A.S.P. CONFERENCE SERIES
PUBLICATIONS COMMITTEE**

**Dr. Sallie L. Baliunas, Chair
Dr. John P. Huchra
Dr. Roberta M. Humphreys
Dr. Catherine A. Pilachowski**

**© Copyright 1995 Astronomical Society of the Pacific
390 Ashton Avenue, San Francisco, California 94112**

All rights reserved

Printed by BookCrafters, Inc.

First published 1995

**Library of Congress Catalog Card Number: 95-77972
ISBN 1-866733-03-1
D. Harold McNamara, Managing Editor of Conference Series
Box 63 KMB
Brigham Young University
Provo, UT 84602
801-378-2298**

**pasp@astro.byu.edu
Fax 801-378-2265**

A SERIES OF BOOKS ON RECENT DEVELOPMENTS IN ASTRONOMY AND ASTROPHYSICS

- Vol. 1-Progress and Opportunities in Southern Hemisphere Optical Astronomy: The CTIO 25th Anniversary Symposium
ed. V. M. Blanco and M. M. Phillips ISBN 0-937707-18-X
- Vol. 2-Proceedings of a Workshop on Optical Surveys for Quasars
ed. P. S. Osmer, A. C. Porter, R. F. Green, and C. B. Foltz ISBN 0-937707-19-8
- Vol. 3-Fiber Optics in Astronomy
ed. S. C. Barden ISBN 0-937707-20-1
- Vol. 4-The Extragalactic Distance Scale: Proceedings of the ASP 100th Anniversary Symposium
ed. S. van den Bergh and C. J. Pritchet ISBN 0-937707-21-X
- Vol. 5-The Minnesota Lectures on Clusters of Galaxies and Large-Scale Structure
ed. J. M. Dickey ISBN 0-937707-22-8
- Vol. 6-Synthesis Imaging in Radio Astronomy: A Collection of Lectures from the Third NRAO Synthesis Imaging Summer School
ed. R. A. Perley, F. R. Schwab, and A. H. Bridle ISBN 0-937707-23-6
- Vol. 7-Properties of Hot Luminous Stars: Boulder-Munich Workshop
ed. C. D. Garmany ISBN 0-937707-24-4
- Vol. 8-CCDs in Astronomy
ed. G. H. Jacoby ISBN 0-937707-25-2
- Vol. 9-Cool Stars, Stellar Systems, and the Sun. Sixth Cambridge Workshop
ed. G. Wallerstein ISBN 0-937707-27-9
- Vol. 10-The Evolution of the Universe of Galaxies. The Edwin Hubble Centennial Symposium
ed. R. G. Kron ISBN 0-937707-28-7
- Vol. 11-Confrontation Between Stellar Pulsation and Evolution
ed. C. Cacciari and G. Clementini ISBN 0-937707-30-9
- Vol. 12-The Evolution of the Interstellar Medium
ed. L. Blitz ISBN 0-937707-31-7
- Vol. 13-The Formation and Evolution of Star Clusters
ed. K. Janes ISBN 0-937707-32-5
- Vol. 14-Astrophysics with Infrared Arrays
ed. R. Elston ISBN 0-937707-33-3
- Vol. 15-Large-Scale Structures and Peculiar Motions in the Universe
ed. D. W. Latham and L. A. N. da Costa ISBN 0-937707-34-1
- Vol. 16-Atoms, Ions and Molecules: New Results in Spectral Line Astrophysics
ed. A. D. Haschick and P. T. P. Ho ISBN 0-937707-35-X
- Vol. 17-Light Pollution, Radio Interference, and Space Debris
ed. D. L. Crawford ISBN 0-937707-36-8
- Vol. 18-The Interpretation of Modern Synthesis Observations of Spiral Galaxies
ed. N. Duric and P. C. Crane ISBN 0-937707-37-6
- Vol. 19-Radio Interferometry: Theory, Techniques, and Application, IAU Colloquium 131
ed. T. J. Cornwell and R. A. Perley ISBN 0-937707-38-4
- Vol. 20-Frontiers of Stellar Evolution, celebrating the 50th Anniversary of McDonald Observatory
ed. D. L. Lambert ISBN 0-937707-39-2

- Vol. 21-The Space Distribution of Quasars
ed. D. Crampton ISBN 0-937707-40-6
- Vol. 22-Nonisotropic and Variable Outflows from Stars
ed. L. Drissen, C. Leitherer, and A. Nota ISBN 0-937707-41-4
- Vol. 23-Astronomical CCD Observing and Reduction Techniques
ed. S. B. Howell ISBN 0-937707-42-4
- Vol. 24-Cosmology and Large-Scale Structure in the Universe
ed. R. R. de Carvalho ISBN 0-937707-43-0
- Vol. 25-Astronomical Data Analysis Software and Systems I
ed. D. M. Worrall, C. Biemesderfer, and J. Barnes ISBN 0-937707-44-9
- Vol. 26-Cool Stars, Stellar Systems, and the Sun, Seventh Cambridge Workshop
ed. M. S. Giampapa and J. A. Bookbinder ISBN 0-937707-45-7
- Vol. 27-The Solar Cycle
ed. K. L. Harvey ISBN 0-937707-46-5
- Vol. 28-Automated Telescopes for Photometry and Imaging
ed. S. J. Adelman, R. J. Dukes, Jr., and C. J. Adelman ISBN 0-937707-47-3
- Vol. 29-Workshop on Cataclysmic Variable Stars
ed. N. Vogt ISBN 0-937707-48-1
- Vol. 30-Variable Stars and Galaxies, in honor of M. S. Feast on his retirement
ed. B. Warner ISBN 0-937707-49-X
- Vol. 31-Relationships Between Active Galactic Nuclei and Starburst Galaxies
ed. A. V. Filippenko ISBN 0-937707-50-3
- Vol. 32-Complementary Approaches to Double and Multiple Star Research, IAU Colloquium 135
ed. H. A. McAlister and W. I. Hartkopf ISBN 0-937707-51-1
- Vol. 33-Research Amateur Astronomy
ed. S. J. Edberg ISBN 0-937707-52-X
- Vol. 34-Robotic Telescopes in the 1990s
ed. A. V. Filippenko ISBN 0-937707-53-8
- Vol. 35-Massive Stars: Their Lives in the Interstellar Medium
ed. J. P. Cassinelli and E. B. Churchwell ISBN 0-937707-54-6
- Vol. 36-Planets and Pulsars
ed. J. A. Phillips, S. E. Thorsett, and S. R. Kulkarni ISBN 0-937707-55-4
- Vol. 37-Fiber Optics in Astronomy II
ed. P. M. Gray ISBN 0-937707-56-2
- Vol. 38-New Frontiers in Binary Star Research
ed. K. C. Leung and I. S. Nha ISBN 0-937707-57-0
- Vol. 39-The Minnesota Lectures on the Structure and Dynamics of the Milky Way
ed. Roberta M. Humphreys ISBN 0-937707-58-9
- Vol. 40-Inside the Stars, IAU Colloquium 137
ed. Werner W. Weiss and Annie Baglin ISBN 0-937707-59-7
- Vol. 41-Astronomical Infrared Spectroscopy: Future Observational Directions
ed. Sun Kwok ISBN 0-937707-60-0
- Vol. 42-GONG 1992: Seismic Investigation of the Sun and Stars
ed. Timothy M. Brown ISBN 0-937707-61-9

- Vol. 43-Sky Surveys: Protostars to Protogalaxies
ed. B. T. Soifer ISBN 0-937707-62-7
- Vol. 44-Peculiar Versus Normal Phenomena in A-Type and Related Stars
ed. M. M. Dworetzky, F. Castelli, and R. Faraggiana ISBN 0-937707-63-5
- Vol. 45-Luminous High-Latitude Stars
ed. D. D. Sasselov ISBN 0-937707-64-3
- Vol. 46-The Magnetic and Velocity Fields of Solar Active Regions, IAU Colloquium 141
ed. H. Zirin, G. Ai, and H. Wang ISBN 0-937707-65-1
- Vol. 47-Third Decennial US-USSR Conference on SETI
ed. G. Seth Shostak ISBN 0-937707-66-X
- Vol. 48-The Globular Cluster-Galaxy Connection
ed. Graeme H. Smith and Jean P. Brodie ISBN 0-937707-67-8
- Vol. 49-Galaxy Evolution: The Milky Way Perspective
ed. Steven R. Majewski ISBN 0-937707-68-6
- Vol. 50-Structure and Dynamics of Globular Clusters
ed. S. G. Djorgovski and G. Meylan ISBN 0-937707-69-4
- Vol. 51-Observational Cosmology
ed. G. Chincarini, A. Iovino, T. Maccacaro, and D. Maccagni ISBN 0-937707-70-8
- Vol. 52-Astronomical Data Analysis Software and Systems II
ed. R. J. Hanisch, J. V. Brissenden, and Jeannette Barnes ISBN 0-937707-71-6
- Vol. 53-Blue Stragglers
ed. Rex A. Saffer ISBN 0-937707-72-4
- Vol. 54-The First Stromlo Symposium: The Physics of Active Galaxies
ed. Geoffrey V. Bicknell, Michael A. Dopita, and Peter J. Quinn ISBN 0-937707-73-2
- Vol. 55-Optical Astronomy from the Earth and Moon
ed. Diane M. Pyper and Ronald J. Angione ISBN 0-937707-74-0
- Vol. 56-Interacting Binary Stars
ed. Allen W. Shafter ISBN 0-937707-75-9
- Vol. 57-Stellar and Circumstellar Astrophysics
ed. George Wallerstein and Alberto Noriega-Crespo ISBN 0-937707-76-7
- Vol. 58-The First Symposium on the Infrared Cirrus and Diffuse Interstellar Clouds
ed. Roc M. Cutri and William B. Latter ISBN 0-937707-77-5
- Vol. 59-Astronomy with Millimeter and Submillimeter Wave Interferometry
ed. M. Ishiguro and Wm. J. Welch ISBN 0-937707-78-3
- Vol. 60-The MK Process at 50 Years: A Powerful Tool for Astrophysical Insight
ed. C. J. Corbally, R. O. Gray, and R. F. Garrison ISBN 0-937707-79-1
- Vol. 61-Astronomical Data Analysis Software and Systems III
ed. Dennis R. Crabtree, R. J. Hanisch, and Jeannette Barnes ISBN 0-937707-80-5
- Vol. 62-The Nature and Evolutionary Status of Herbig Ae / Be Stars
ed. P. S. Thé, M. R. Pérez, and E. P. J. van den Heuvel ISBN 0-937707-81-3
- Vol. 63-Seventy-Five Years of Hirayama Asteroid Families: The role of Collisions in the Solar System History
ed. R. Binzel, Y. Kozai, and T. Hirayama ISBN 0-937707-82-1
- Vol. 64-Cool Stars, Stellar Systems, and the Sun, Eighth Cambridge Workshop
ed. Jean-Pierre Caillault ISBN 0-937707-83-X

- ed. Dan P. Clemens and Richard Barvainis ISBN 0-937707-84-8
- Vol. 66- Physics of the Gaseous and Stellar Disks of the Galaxy
ed. Ivan R. King ISBN 0-937707-85-6
- Vol. 67-Unveiling Large-Scale Structures Behind the Milky Way
ed. C. Balkowski and R. C. Kraan-Korteweg ISBN 0-937707-86-4
- Vol. 68-Solar Active Region Evolution: Comparing Models with Observations
ed. K. S. Balasubramaniam and George W. Simon ISBN 0-937707-87-2
- Vol. 69-Reverberation Mapping of the Broad-Line Region in Active Galactic Nuclei
ed. P. M. Gondhalekar, K. Horne, and B. M. Peterson ISBN 0-937707-88-0
- Vol. 70-Groups of Galaxies
ed. Otto G. Richter and Kirk Borne ISBN 0-937707-89-9
- Vol. 71-Tridimensional Optical Spectroscopic Methods in Astrophysics
ed. G. Comte and M. Marcelin ISBN 0-937707-90-2
- Vol. 72-Millisecond Pulsars—A Decade of Surprise, ed. A. A. Fruchter
M. Tavani, and D. C. Backer ISBN 0-937707-91-0
- Vol. 73-Airborne Astronomy Symposium on the Galactic Ecosystem: From Gas to Stars to Dust
ed. M. R. Haas, J. A. Davidson, and E. F. Erickson ISBN 0-937707-92-9
- Vol. 74-Progress in the Search for Extraterrestrial Life,
ed. G. Seth Shostak ISBN 0-937707-93-7
- Vol. 75-Multi-Feed Systems for Radio Telescopes
ed. D. T. Emerson and J. M. Payne ISBN 0-937707-94-5
- Vol. 76-GONG '94: Helio- and Astero-Seismology from the Earth and Space
ed. Roger K. Ulrich, Edward J. Rhodes, Jr., and Werner Däppen ISBN 0-937707-95-3
- Vol. 77-Astronomical Data Analysis Software and Systems IV
ed. R. A. Shaw, H. E. Payne, and J. J. E. Hayes ISBN 0-937707-96-1
- Vol. 78-Astrophysical Applications of Powerful New Databases
ed. S. J. Adelman and W. L. Wiese ISBN 0-937707-97-X
- Vol. 79-Robotic Telescopes: Current Capabilities, Present Developments, and Future
Prospects for Automated Astronomy
ed. Gregory W. Henry and Joel A. Eaton ISBN 0-937707-98-8
- Vol. 80-The Physics of the Interstellar Medium and Intergalactic Medium
ed. A. Ferrara, C. F. McKee, C. Heiles, and P. R. Shapiro ISBN 0-937707-99-6
- Vol. 81-Laboratory and Astronomical High Resolution Spectra
ed. A. J. Sauval, R. Blomme, and N. Grevesse ISBN 1-886733-01-5
- Vol. 82-Very Long Baseline Interferometry and the VLBA,
ed. J. A. Zensus, P. K. Diamond, and P. J. Napier ISBN 1-886733-02-3
- Vol. 83-Astrophysical Applications of Stellar Pulsation, IAU Colloquium 155
ed. R. S. Stobie and P. A. Whitelock ISBN 1-886733-03-1

Inquiries concerning these volumes should be directed to the:

**Astronomical Society of the Pacific
CONFERENCE SERIES**

390 Ashton Avenue
San Francisco, CA 94112-1722
415-337-1100
e-mail asp @ stars.sfsu.edu

ASTRONOMICAL SOCIETY OF THE PACIFIC
CONFERENCE SERIES



Volume 83

**ASTROPHYSICAL APPLICATIONS
OF STELLAR PULSATION**

**Proceedings of IAU Colloquium 155
held in Cape Town, 6-10 February 1995**

**Edited by
R. S. Stobie and P. A. Whitelock**

vii

ASTRONOMICAL SOCIETY OF THE PACIFIC
CONFERENCE SERIES



Volume 83

Table of Contents

Preface	xix
William Wehlau	xxi
Adriaan Wesselink	xxii
Conference participants	xxiii

Part 1. The Scientific Programme

Population I Stellar Structure and Evolution: facing the lingering difficulties to make a step forward	1
<i>A. Maeder</i>	
Population II Stellar Structure and Evolution: A Few Selected Topics	12
<i>C. Chiosi</i>	
Pulsation and Evolution. An observer's viewpoint	23
<i>C. Waelkens</i>	
Recent Developments in Stellar Pulsation Theory	31
<i>A. Gautschy</i>	
Oblique Pulsator Model for the Blazhko Effect of RR Lyrae Stars	42
<i>H. Shibahashi and M. Takata</i>	
New Results on Pulsating OB Stars	44
<i>P. Moskalik</i>	
Mode Identification of the β Cephei star BW Vulpeculae	56
<i>C. Aerts, T. Van Hoolst and P. Mathias</i>	
Rapid Pulsations in Ap Stars	58
<i>P. Martinez and D. W. Kurtz</i>	
Astrophysical Applications of Delta Scuti Stars	70
<i>M. Breger</i>	
Probing the Extraordinary Ends of Ordinary Stars: White Dwarf Seismology with the Whole Earth Telescope	81
<i>S. D. Kawaler</i>	
Seismological Properties of Evolutionary Delta Scuti Models Using OPAL Opacities	92
<i>J. A. Guzik and P. A. Bradley</i>	
Precision Asteroseismology of DAV (ZZ Ceti) White Dwarf Stars	94
<i>P. A. Bradley</i>	
Confining the Edges of the GW Vir Instability Strip	96
<i>K. Werner, T. Rauch, S. Dreizler and U. Heber</i>	

Helioseismology	98
<i>R. L. Gilliland</i>	
More on Solar-like Oscillations in η Boo	109
<i>T. R. Bedding and H. Kjeldsen</i>	
Simulated Power Spectra of Solar-Type Oscillations Driven by an Elementary Excitation Source	111
<i>I. W. Roxburgh and S. V. Vorontsov</i>	
Radio Observations of Mira Variables, OH/IR Stars and M-Supergiants	113
<i>J. M. Chapman, H. J. Habing and N. E. B. Killeen</i>	
Mira Variables: Theory versus Observation	127
<i>P. R. Wood</i>	
Long Term Non Linear Thermal Effects in the Pulsation of Mira Variables	139
<i>A. Yaari and Y. Tuchman</i>	
The Mass Loss Rate – Period Relation in Carbon Miras	141
<i>M. Groenewegen</i>	
Yellow Supergiants and R Coronae Borealis Stars	143
<i>P. L. Cottrell</i>	
Classical Cepheids and Galactic Structure	155
<i>J. D. Fernie</i>	
Pulsating Cool Stars and Galactic Structure	165
<i>P. Whitelock</i>	
Observations and Interpretation of Luminous Blue Variables	176
<i>H. J. G. L. M. Lamers</i>	
Theoretical Pulsations of Luminous Blue Variables	192
<i>A. N. Cox, J. A. Guzik, M. S. Soukup and S. M. Morgan</i>	
Rotation Curve and Metallicity of the Outer Disc from Cepheids	194
<i>F. Pont, D. Queloz, M. Mayor and P. Bratschi</i>	
Dust Formation and the Doubly-Periodic Variable Stars	196
<i>T. Lloyd Evans</i>	
Pulsating Stars and the Distance Scale - I	198
<i>A. R. Walker</i>	
Properties of the SX Phoenicis Stars in the Metal-Poor Globular Cluster NGC 5053, and Pulsation Modes of Three of the Newly-Discovered SX Phe Stars in 47 Tuc	207
<i>J. M. Nemeč</i>	
Pulsating Stars and the Distance Scale - II	209
<i>M. Feast</i>	
Variable Stars in the MACHO Collaboration Database	221
<i>K. H. Cook, C. Alcock, R. A. Allsman, T. S. Axelrod, K. C. Freeman, B. A. Peterson, P. J. Quinn, A. W. Rodgers, D. P. Bennett, J. Reimann, K. Griest, S. L. Marshall, M. R. Pratt, C. W. Stubbs, W. Sutherland and D. L. Welch</i>	

Cepheids in the Magellanic Clouds	232
<i>D. L. Welch, C. Alcock, D. P. Bennett, K. H. Cook, R. A. Allsman, T. S. Axelrod, K. C. Freeman, B. A. Peterson, P. J. Quinn, A. W. Rodgers, K. Griest, S. L. Marshall, M. R. Pratt, C. W. Stubbs and W. Sutherland</i>	
HIPPARCOS Data on Pulsating Stars	241
<i>C. Turon and F. van Leeuwen</i>	
Cepheid Binaries: Frequency and Mass Ratios	252
<i>N. R. Evans</i>	
Cepheid Radii and Distances	254
<i>C. D. Laney and R. S. Stobie</i>	
Common Misconceptions about the Galactic Cluster Calibration of the Cepheid PLC Relation	256
<i>D. G. Turner</i>	
The H_0 Key Project: Cepheids in NGC925, M101 and M100	258
<i>S. M. G. Hughes</i>	
EROS: Short Period Cepheids in the Bar of the LMC	260
<i>J. P. Beaulieu</i>	
Interferometry of Cool Pulsating Stars	270
<i>C. Haniff</i>	
SUSI's Potential for Cepheid Studies	281
<i>A. J. Booth, J. Davis and R. R. Shobbrook</i>	

Part 2. Poster Papers

Detection of Weak Periodic Signals from Irregularly Spaced Observations	283
<i>J. Pfeiderer and M. Mössner</i>	
A New Asymptotic Treatment of g -modes of a Star	285
<i>P. Smeyers, T. Van Hoolst, I. De Boeck and L. Decock</i>	
Quadratic and Cubic Couplings of Oscillation Modes of Stars	287
<i>T. Van Hoolst</i>	
Asteroseismology of the β Cephei Variable 16 (EN) Lacertae	289
<i>W. A. Dziembowski and M. Jerzykiewicz</i>	
Uncertainties in the Position of the β Cephei Instability Strip in the HR Diagram	291
<i>A. A. Pamyatnykh, W. A. Dziembowski and P. Moskalik</i>	
A Search for Variable B Stars in the Northern Open Clusters	293
<i>A. Pigulski, M. Jerzykiewicz and G. Kopacki</i>	
On the $H\alpha$ Emission Phase of β Cep	295
<i>L. Kaper and P. Mathias</i>	

A Period Analysis of the Optical Line Variability of β Cephei	297
<i>J. Telting, C. Aerts and P. Mathias</i>	
Search for Pulsational Instability among h Persei Stars	299
<i>J. Krzesinski</i>	
NRP Modes in a Be Star Zeta Oph	301
<i>E. Kambe, R. Hirata, M. Kato, H. Ando, E. J. Kennelly, G. A. H. Walker, S. Štefl and A. E. Tarasov</i>	
A First Search for Rapid Variations of Stellar and Circumstellar Balmer Discontinuity in Be Stars	303
<i>S. Štefl, D. Baade and J. Cuypers</i>	
Rapid Photometric and Spectroscopic Variability of the Be Star DX Eri	305
<i>S. Štefl and L. A. Balona</i>	
The Line Profile Variations of 60 Cyg (HD 200310)*	307
<i>P. Koubský, D. Ballereau, J. Chauville and J. Horn</i>	
Two Modes of Pulsation in the Rapidly Rotating O9.5 Dwarf, HD 93521	309
<i>A. H. N. Reid, D. Bohlender, C. T. Bolton, A. W. Fullerton, I. D. Howarth, C. Manz, K. C. Smith and R. H. D. Townsend.</i>	
Eta Orionis	311
<i>K. De Mey, C. Aerts, H. Van Winckel and C. Waelkens</i>	
Second-Order Rotational Effects on Observations of β Cephei Stars . . .	313
<i>C. A. Engelbrecht</i>	
The Evolutionary Status of λ Boo Stars	315
<i>E. Paunzen, M. Gelbmann, U. Heiter, F. Kupka, R. Kuschnig and W. W. Weiss</i>	
Fine Analysis of Pulsating CP Stars	317
<i>F. Kupka, M. Gelbmann, U. Heiter, R. Kuschnig, W. W. Weiss and T. A. Ryabchikova</i>	
Spatial Integration Grids in Line Profile Modelling of Nonradially Pulsat- ing Magnetic Stars	319
<i>R. M. Fensl, G. Könighofer and M. J. Stift</i>	
Consequences of Rapid Rotation on Mode Identification	321
<i>F. Soufi, M. J. Goupil, W. A. Dziembowski and R. Sienkiewicz</i>	
Light Variability of 28 Aql	323
<i>W. Wehlau and A. Wehlau</i>	
Analysis of the Asteroseismological Data of six δ Scuti Stars in the Open Cluster NGC 6134	325
<i>N. Audard, H. Kjeldsen and S. Frandsen</i>	
Asteroseismology in Open Clusters	327
<i>S. Frandsen, M. Viskum, M. M. Hernández and J. A. Belmonte</i>	
Radial Pulsation among δ Sct Stars	329
<i>E. Rodríguez, A. Rolland, P. López de Coca and S. Martín</i>	

New WET Observations of the δ Scuti Star CD-24 7599: amplitude variability and discovery of 13 pulsation modes	331
<i>G. Handler, D. O'Donoghue, D. A. H. Buckley, O. Giovannini, S. O. Kepler, J. L. Provencal, M. A. Wood, J. C. Clemens, M. S. O'Brien, S. J. Kleinman, T. K. Watson, R. E. Nather, D. E. Winget, A. Kanaan, A. Nitta, M. H. Montgomery, E. Klumpe, P. A. Bradley, D. J. Sullivan, K. Wu and E. Leibowitz</i>	
Asteroseismology in Praesepe: the case of EP Cnc	333
<i>J. A. Belmonte, A. Claret and F. Pérez Hernández</i>	
The Variable Star Population in the Center of 47 Tuc as defined by <i>HST</i> Observations	335
<i>R. L. Gilliland, P. D. Edmonds, L. Petro, A. Saha and M. Shara</i>	
Insights into the Pulsational Behaviour of δ Sct Stars	337
<i>L. Mantegazza and E. Poretti</i>	
Simultaneous Photometric and Spectroscopic Observations of the unusual Variable F-type stars HD 224638 and HD 224945.	339
<i>L. Mantegazza, E. Poretti, M. Bossi and F. M. Zerbi</i>	
Slowly Variable Early F-type Stars	341
<i>L. A. Balona and K. Krisciunas</i>	
On the Mechanism of Mode Selection in Rapidly-Oscillating Magnetic Ap-Stars	343
<i>I. W. Roxburgh and S. V. Vorontsov</i>	
The Cape Rapidly Oscillating Ap Star Survey	345
<i>P. Martinez</i>	
Velocity Variations of the roAp Star γ Equulei: Probing a puzzling pulsator	347
<i>J. M. Matthews and S. Scott</i>	
The Cepheid Data Base	349
<i>L. N. Berdnikov</i>	
Estimating Cepheid Metallicities: a new approach	351
<i>E. Zsoldos</i>	
The Chemical Composition of S-Cepheids and Double-Mode Cepheids .	353
<i>I. A. Usenko, V. V. Kovtjukh, S. M. Andrievsky, V. G. Klochkova and G. A. Galazutdinov</i>	
Models of the Double-mode Cepheids in the Large Magellanic Cloud . .	355
<i>J. O. Petersen and J. Christensen-Dalsgaard</i>	
Cepheids in Binary and Multiple Systems	357
<i>L. Szabados</i>	
The Use of Maximum Light in Cepheid Distance Estimators	359
<i>S. M. Kanbur and M. A. Hendry</i>	
Independent Distance Determinations to Milky Way Cepheids in Open Clusters: A progress report on four stars	361
<i>W. P. Gieren, J. M. Matthews, J-C. Mermilliod and D. L. Welch</i>	

Uncertainties in the Galactic Cepheid Distance Scale	363
<i>T. G. Barnes III and T. J. Moffett</i>	
Comparison of the Galactic Cepheid Open Cluster and Surface Brightness Distance Scales	365
<i>W. P. Gieren and P. Fouqué</i>	
Type II? Cepheid Radii and TX Del	367
<i>C. D. Laney</i>	
Baade-Wesselink Analysis of Type II Cepheids	369
<i>J. Vinkó and Z. Balog</i>	
Turbulence Variations in Cepheids	371
<i>D. Bersier and G. Burki</i>	
Formation Depths of Spectral Lines in Cepheids	373
<i>M. D. Albrow and P. L. Cottrell</i>	
The Centre-of-Mass Velocity of a Radially Pulsating Star: Insights from NLTE Models	375
<i>D. D. Sasselov</i>	
Accurate CCD Light Curves of Cepheids in the Large Magellanic Cloud	377
<i>E. Poretti, L. Mantegazza and E. Antonello</i>	
Baade-Wesselink Analysis of a Sample of Equal Period SMC Cepheids. A progress report.	379
<i>J. Storm, B. W. Carney, W. Freedman and B. F. Madore</i>	
Cepheid Distances to Nearby Galaxies	381
<i>W. P. Gieren, P. Candia, P. Fouqué, G. Hertling and E. Brieva</i>	
Cepheids and LPVs in and around Magellanic Cloud Clusters	383
<i>K. M. Sebo and P. R. Wood</i>	
Iron Abundances of the Cluster RR Lyrae Variables Based on Their Light Curves	385
<i>J. Jurcsik and G. Kovács</i>	
A Century in Period Changes of the Variables in M15	387
<i>K. Barlai and B. Szeidl</i>	
The Distribution of the RR Lyrae Variables in ω Centauri and Background Light	389
<i>J. O. Petersen and M. Andersen</i>	
RR Lyrae Variables in NGC 7006	391
<i>A. Wehlau, R. W. Slawson, J. M. Nemec and S. Butterworth</i>	
The Temperature of the Supergiant α Per	393
<i>N. R. Evans, T. J. Teays, L. L. Taylor, J. B. Lester and R. B. Hindsley</i>	
On the Variability of Supergiant Stars	395
<i>G. Burki and F. Kienzle</i>	

The Mass Loss and Pulsation Activity in Supernova Progenitors	397
<i>O. A. Tsiopa</i>	
Infrared Radial Velocity Results for Long Period Variables	399
<i>K. H. Hinkle</i>	
Studies of Small-Amplitude Red Variables	401
<i>J. R. Percy, W. Au, A. Desjardins and L. Yu</i>	
Pulsation and Long-Periods in Three Nearby M Supergiants	403
<i>M. A. Smith, T. J. Teays, L. L. Taylor, R. Wasatonic, E. F. Guinan and S. Baliunas</i>	
Mode Switching in Red Semiregular Variable Stars?	405
<i>J. Gál and K. Szatmáry</i>	
Blackbody Fits of Semiregular Variables	407
<i>F. Kerschbaum and J. Hron</i>	
The Long-term Variation in the RV Tauri Star U Mon	409
<i>K. R. Pollard and P. L. Cottrell</i>	
Pulsation Properties of a Sample of Mira and OH/IR Stars	411
<i>M. J. Gaylard and M. E. West</i>	
A New, Systematic Search at 1612 MHz for OH/IR Stars in the Inner Galaxy	413
<i>M. N. Sevenster, H. J. Habing, J. M. Chapman and N. E. B. Killeen</i>	
Pulsations of Long-Period Variables and their Connection to Variations of Circumstellar Maser Emission	415
<i>G. M. Rudnitskij</i>	
Light Curve Analysis of Long Period Pulsating Stars with the Wavelet Method: The semiregular star V Boo	417
<i>K. Szatmáry, J. Gál and L. L. Kiss</i>	
On the Formation of Hydrogen Emission Lines in Miras	419
<i>P. de Laverny and C. Magnan</i>	
The AAVSO and its Variable Star Databank on Pulsating Stars	421
<i>J. A. Mattei</i>	
Miras and Galactic Populations	423
<i>M. O. Mennessier, X. Luri, F. Figueras and J. Torra</i>	
On the Nature of M stars with a 60 microns Excess	425
<i>C. Loup, L. B. F. M. Waters, F. Kerschbaum, J. Hron, E. Josselin, D. Kester, T. R. Bontekoe and A. Zijlstra</i>	
Obscured AGB Stars in the LMC	427
<i>A. Zijlstra, C. Loup, L. B. F. M. Waters, P. Whitelock and F. Guglielmo</i>	
Mid-IR Imaging of AGB Stars and Circumstellar Modelling	429
<i>M. Busso, L. Origlia, G. Silvestro, M. Marengo, P. Persi and M. Ferrari-Toniolo</i>	

Long-term Photometric Monitoring of Cool Hydrogen-deficient Carbon Stars	431
<i>P. L. Cottrell, A. C. Gilmore, P. M. Kilmartin and W. A. Lawson</i>	
Pulsations and Dust Formation in R Coronae Borealis Stars	433
<i>G. C. Clayton, B. A. Whitney and W. A. Lawson</i>	
A Nonlinear Pulsation Model for V652 Her	435
<i>Y. A. Fadeyev and A. E. Lynas-Gray</i>	
Pulsating Degenerate Stars in the EC Survey	437
<i>R. S. Stobie, C. Koen, D. Kilkenny and D. O'Donoghue</i>	
The Effect of Proper Motion on \dot{P} in Pulsating Stars	439
<i>G. Pajdosz</i>	
The Pulsating White Dwarf L19-2	441
<i>D. J. Sullivan</i>	
Pulsations in the Nucleus of Planetary Nebula IC 418?	443
<i>E. Kuczawska and S. Zola</i>	
Thermonuclear Excitation of <i>R</i> -modes in Neutron Stars	445
<i>U. Lee and T. E. Strohmayer</i>	
Near-surface Effects in Modelling Oscillations of η Boo	447
<i>J. Christensen-Dalsgaard, T. R. Bedding, G. Houdek, H. Kjeldsen, C. Rosenthal, R. Trampedach, M. J. P. F. G. Monteiro and A. Nordlund</i>	
An Analytic Theory of Adiabatic <i>p</i> -modes in the Atmospheres of the Sun and Sun-like Stars	449
<i>N. S. Dzhililov and J. Staude</i>	
Visibility Functions of Solar and Stellar Irradiance Variations	451
<i>J. Staude, G. Bartling, Y. D. Zhugzhda and N. S. Dzhililov</i>	
On Expected Constraints on Stellar Transport Processes from Space Seismic Missions: EVRIS, COROT	453
<i>M. J. Goupil, E. Michel, S. Cassisi, W. A. Dziembowski, Y. Lebreton, A. Baglin, M. Auvergne and C. Catala</i>	
STARS - A Seismic Telescope for Astrophysical Research from Space . .	455
<i>I. W. Roxburgh</i>	
Variability Studies and Asteroseismology with the XMM Optical Monitor	457
<i>S. Horner and E. Antonello</i>	
Author index	459
Subject index	463