Contents

introduction	
Chapter 1: Solar Observations	
1.1 Observations of Oscillations Observations of Waves and Oscillations By FL. Deubner (With 2 Figures)	
Observations of Waves and Oscillations in Solar Magnetic Fluxtube Concentrations By B. Fleck and FL. Deubner (With 1 Figure)	
The Generation of Long Period Acoustic Waves by Solar Global Oscillations By B. Fleck and F. Schmitz (With 1 Figure)	
Measurements of 1-Hz Coronal Oscillations at Total Eclipses and Their Implications for Coronal Heating By J.M. Pasachoff	
Short-Term Oscillations in Green and Red Coronal Lines By V. Rusin and M. Minarovjech (With 1 Figure)	
Height-Dependent Short-Period Oscillations in the Fe XIV (530.3 nm) Solar Corona Above a Sunspot Group Crossing the Limb By V.N. Dermendjiev (With 2 Figures)	
1.2 Photospheric Dynamics and Heating On the Dynamics of Granulation in Active Regions and the Heating Problem By A. Nesis, A. Hanslmeier, R. Hammer, R. Komm, and W. Mattig (With 2 Figures)	
Generation of Electric Currents and Waves on Magnetic Flux Tubes by Horizontal Velocities in the Photosphere By T.D. Tarbell, G.L. Slater, Z.A. Frank, R.A. Shine, and K.P. Topka (With 1 Figure)	
On the Magnetic Field Activity in Solar Active Regions By J. Linke	



1.3 Chromospheric Observations and Heating The Bright Points in the Ca II K-Line and Their Relation to the Inner Network Magnetic Structures
By K.R. Sivaraman (With 1 Figure)
K _{2V} Cell Grains and Chromospheric Heating By R.J. Rutten and H. Uitenbroek (With 1 Figure)
Wave Heating in Chromospheric Bright Points By W. Kalkofen54
Do We Really Know What the Actual Chromospheric Heating Requirements Are? By J. Trujillo Bueno (With 1 Figure)
The Effects of Electron Scattering on the Si II 1816 Line in the Solar Chromosphere
By K.E. Rangarajan and D.M. Rao (With 1 Figure)
SIMURIS: a High Resolution Solar Physics Interferometric Mission in Answer to the Chromospheric and Coronal Heating Problem
By L. Damé (With 2 Figures)
By L. Damé (With 3 Figures)
1.4 Chromosphere-Transition Layer Observations and Modelling HRTS Time Series Observations: Chromospheric and Coronal Heating By CC. Cheng (With 5 Figures)
High Spatial Resolution Observations of the Solar Transition Region: Spicules and Microflares By J. W. Cook (With 6 Figures)
New Models of the Chromosphere and Transition Region By E.H. Avrett (With 2 Figures)
The Role of Particle Diffusion in the Lower Transition Region: Revised Interpretation of Emission Measures By E.H. Avrett and J.M. Fontenla (With 2 Figures)
Why Heating is Not Necessary in the Transition Region or Upper Chromosphere
By P.S. Cally (With 3 Figures) 103 Height-Dependent Solar Plage Temperature Distribution
By A. Kucera, Z. Scherbakova, and E. Baranovsky (With 3 Figures) 109 On the Temperature Inhomogeneity of the Lower Solar Corona
By K.I. Nikolskaya
1.5 Coronal and Solar Wind Observations and Modelling Very High Resolution Solar X-ray Imaging
By L. Golub (With 6 Figures)

Spectra of MHD Turbulence in Coronal Active Regions By D. Gomez, P. Martens, M. Herant, F. Pardo, and L. Golub (With 3 Figures)	124
Observations of Coronal Bright Points and Implications for Coronal Heating Mechanisms By S.R. Habbal (With 3 Figures)	127
Modelling Coronal Active Region Emission Patterns By S.F. Brown and C.J. Durrant (With 1 Figure)	132
The Fe Ionization Equilibrium in the Solar Corona With a Non-Maxwellian Distribution Function By E. Dzifcakova (With 3 Figures)	135
Energetics of Solar Coronal Holes By YQ. Lou	137
Coronal Radio Emission By A.O. Benz (With 7 Figures)	140
Implications of Microwaves for Heating and Particle Acceleration on the Sun By A. Krüger, J. Hildebrandt, and S. Urpo	150
Properties of Impulsive Events in a Polar Coronal Hole By S. Koutchmy and M.L. Loucif (With 6 Figures)	152
Explosive Instability in Solar Coronal Loops By M. Ryutova	159
Signatures of Coronal Structures and Turbulence in the Solar Wind By E. Marsch (With 1 Figure)	162
Chapter 2: Stellar Observations	
2.1 Chromospheric and Coronal Observations, UV What Can Solar and Stellar Ultraviolet Observations Tell About Chromospheric and Coronal Heating Mechanisms? By J.L. Linsky (With 1 Figure)	166
He I 5876 Å Line As an Indicator of Chromospheric Heating in Young F-Type MS Stars By R.J. García López, R. Rebolo, J. E. Beckman, and C.D. McKeith (With 1 Figure)	179
Chromospheric Modelling of Active Regions on AU Mic By E.R. Houdebine (With 2 Figures)	182
2.2 Chromospheres of Cool Giant Stars, Infrared New Clues to Atmospheric Heating Processes in Luminous Cool Stars By A.K. Dupree (With 7 Figures)	185

By H.R. Johnson, U.G. Jørgensen, and D.G. Luttermoser (With 2 Figures)	200
What Can Observations of Giants and Supergiant Stars Tell Us About Chromospheric and Coronal Heating? By M. Cuntz and R.E. Stencel	206
Chromospheric Activity in Late-Type Giants and Supergiants: Constraints on Heating Theories By L. Pasquini, E. Brocato, and R. Pallavicini (With 1 Figure)	222
Coronal Heating and the Dividing Line By B. Haisch (With 2 Figures)	225
An Infrared Perspective on Chromospheres By T.R. Ayres (With 3 Figures)	228
2.3 Activity and Magnetic Fields Magnetic Activity Across the Hertzsprung-Russell Diagram By C. Zwaan (With 8 Figures)	241
Relations Between Activity and Magnetic Fields By C.J. Schrijver (With 6 Figures)	257
Recent Measurements of Stellar Magnetic Fields By S. Saar (With 3 Figures)	273
Chromospheric/Coronal Emission Correlations in 'Quiescent' and Eruptive Phenomena in M-Dwarf Stars By M. Mathioudakis and J. G. Doyle (With 1 Figure)	279
Global Electrodynamic Coupling in Stellar Atmospheres By L. Cram	
2.4 Coronal Heating Constraints, X-rays, Hot Stars, Accretion Disks Implications for Coronal Heating Theories from Stellar X-ray Observations By R. Rosner (With 5 Figures)	287
Empirical Constraints on Coronal Heating Processes By C. Jordan (With 5 Figures)	300
Minimum Coronal Energy Requirements: Constraints for Heating Mechanisms By R. Hammer (With 2 Figures)	316
Sun-Hot Star Contrast in Chromospheric/Coronal Te(r). Nonradiative Heating vs. Outflow Enhanced Opacity By V. Doazan and R.N. Thomas	319
Formation of Chromospheres and Coronae of Accretion Disks by Viscous Dissipation By R. Wehrse, H. Störzer, and G. Shaviv (With 2 Figures)	324

Chapter 3: Wave Heating Mechanisms

3.1 Acoustic Waves, Pulsations Acoustic Heating	
<u>•</u>	328
On the Intrinsic Difficulty of Producing Stellar Coronae With Acoustic Waves By R. Hammer and P. Ulmschneider (With 1 Figure)	344
The Effect of Waves on Optically Thin Transition Region Lines By V. Hansteen (With 2 Figures)	347
Heating of the Solar Atmosphere by Spicules By Q.Q. Cheng, P. Ulmschneider, and P. Korevaar (With 4 Figures)	350
Nonlinear Pulse Propagation in a Stratified Atmosphere By G. Bodo, W. Kalkofen, S. Massaglia, and P. Rossi (With 1 Figure)	353
The Shock Wave Heating Mechanism of Pulsating Star Chromospheres By S.M. Andrievsky and G.A. Garbunov (With 2 Figures)	356
Ionization Pumping By C. Lindsey (With 3 Figures)	359
Shock Amplification by Radiation By M. Carlsson and R. Stein (With 1 Figure)	366
3.2 Acoustic and MHD Wave Generation Recent Developments in Theories of Wave Generation By Z. E. Musielak (With 5 Figures)	369
Generation of Acoustic Flux Derived from Numerical Simulations of the Solar Granular Convection By M. Steffen, A. Krüss, and H. Holweger (With 3 Figures)	380
3.3 Magnetoacoustic Waves Magnetoacoustic Waves and Their Congression by Congression	
Magnetoacoustic Waves and Their Generation by Convection By R.F. Stein and Å. Nordlund (With 15 Figures)	386
Magnetoacoustic Heating of the Solar Chromosphere By S.M. Chitre and J.M. Davila (With 1 Figure)	402
Effects of Line-Tying and Non-Uniformities on Thermal Instabilities and Slow MHD Modes By D. Hermans, A.W. Hood, L. Clifford, and A. Milne (With 2 Figures)	405
Heating in Intense Flux Tubes By S.S. Hasan (With 4 Figures)	408
Line Simulation of Solar Structures Permeated by Acoustic and MHD-Waves By W. Rammacher (With 6 Figures)	414
Damping of Shocks in Magnetic Flux Tubes By A. Ferriz Mas and F. Moreno Insertis	417

Heating of the Solar Chromosphere by MHD-Waves By R. Erdélyi and M. Marik (With 3 Figures)	420
3.4 Alfvén Waves Alfvén Waves	423
By J.V. Hollweg	423
Reflection of Alfvén Waves and Heating in Solar Coronal Holes By R.L. Moore, Z.E. Musielak, S.T. Suess, and CH. An (With 1 Figure)	435
Alfvén Wave Propagation in a Solar Magnetic Structure By P.L. Similon and S. Zargham (With 3 Figures)	438
On Propagation and Absorption of Alfvén Waves in Coronal Loops By Y.D. Zhugzhda	442
Magnetic Confinement, Alfvén Wave Reflection, and the Origin of X-ray and Mass Loss "Dividing Lines"	
By CH. An, R. Rosner, Z.E. Musielak, R.L. Moore, and S.T. Suess	445
Heating in Stochastic Magnetic Fields By R.N. Sudan (With 10 Figures)	448
Resonance Absorption Heating By J. M. Davila (With 5 Figures)	464
Resonant Absorption of MHD Waves in Magnetic Loops in the Solar Corona By M. Goossens	480
On the Time Scales and the Efficiency of Solar Coronal Loop Heating by Resonant Absorption By S.M. Poedts (With 1 Figure)	486
Line-Tying Effects on Stability and Heating of Solar Coronal Loops By G. Halberstadt, J.P. Goedbloed, S.M. Poedts, and R.A.M. Van der Linden (With 2 Figures)	489
Coronal Loop Heating by Discrete Alfvén Waves	.03
By C.A. Azevedo, A.S. de Assis, H. Shigueoka, and P.H. Sakanaka	492
3.5 Magnetoacoustic and Alfvén Surface Waves Magnetohydrodynamic Surface Waves By B. Roberts (With 2 Figures)	494
Magnetoacoustic-Gravity Surface Waves	474
By A.J. Miles and B. Roberts (With 1 Figure)	508
Properties of Non-Parallel Magnetoacoustic Surface Waves By R. Jain and B. Roberts (With 1 Figure)	
Viscous Damping of Magnetohydrodynamic Surface Waves	
By M. Ruderman	514
Coronal Loop Heating by the Fast Surface Wave By A.S. de Assis and K.H. Tsui	517

Chapter 4: Electrodynamic Heating Mechanisms

4.1 Current Sheet Formation and Heating The Formation of Current Sheets and Coronal Heating	
By E.R. Priest (With 12 Figures)	520
Current Sheet Formation in Force-Free Magnetic Fields By G. Vekstein and E.R. Priest (With 2 Figures)	536
Two-Dimensional Magnetic Neutral Points By N.R. Strachan and E.R. Priest (With 1 Figure)	539
The Significance of Magnetic Null Points By K. Galsgaard and Å. Nordlund (With 1 Figure)	541
Effect of Coronal Heating on Coronal Arcades By C.D.C. Steele and E.R. Priest (With 3 Figures)	544
Heating by Field Aligned DC Joule Dissipation By D.S. Spicer	547
Joule Heating in the Sun's Lower Transition Region By G. Roumeliotis	562
Plasma Heating by Current Sheets in Solar Active Regions By B. Kliem and N. Seehafer	564
•	JU -
Chromosphere Generation in Magnetic Flux-Tubes By J. C. Hénoux and B. V. Somov (With 1 Figure)	567
4.2 Heating and Helicity	
Coronal Magnetic Structure: the Role of Ideal MHD Invariants By M.A. Berger (With 4 Figures)	570
Current Helicity and the Generation of Magnetic Field Aligned Currents By N. Seehafer and KH. Rädler	582
Nonlinear Evolution of a Force-Free Arcade Field Driven by Shear Flow By N. Bekki, T. Tajima, and J.W. Van Dam (With 1 Figure)	585
4.3 Reconnection, Heating by Flux Emergence Two-Dimensional Magnetic Reconnection	
By M. Jardine (With 7 Figures)	588
Magnetic Field Annihilation Within a Stagnation Point Flow By M. Jardine, E.R. Priest, and H.R. Allen (With 2 Figures)	601
Three-Dimensional Magnetic Reconnection: Basic Concepts By M. Hesse, K. Schindler, and J. Birn (With 3 Figures)	604
Atmospheric Heating in Emerging Flux Regions By K. Shibata, S. Nozawa, R. Matsumoto, T. Tajima, and A.C. Sterling	
(With 2 Figures)	609

4.4 Micro/Nanoflare Coronal Heating	
Micro/Nanoflare Coronal Heating	
By E.N. Parker (With 8 Figures)	615
Numerical Simulation of Microflare Evolution	
in the Solar Transition Region and Corona	
By A.C. Sterling and J.T. Mariska (With 4 Figures)	630
Coronal Heating by Nanoflares: Plasma Dynamics of Elementary Events	
By R.A. Kopp and G. Poletto (With 2 Figures)	634
Coronal Heating by Nanoflares: Possible Evidence of Plasmoids	
in Radio Occultation Data	
By D.J. Mullan	637
Author Index	641
List of Participants	643