



## TABLE OF CONTENTS

PREFACE		xiii
LIST OF PARTICIPANTS		xv
PART I. THE LIFE HISTORY OF CORONAL STRUCTURES AND FIELDS		
1.	Evolution of Coronal and Interplanetary Magnetic Fields (invited) <i>R. H. Levine</i>	1
2.	Search for Giant Cells in the Solar Convection Zone <i>B. J. LaBonte and R. Howard</i>	21
3.	Dynamics of Large-Scale Magnetic Field Evolution During Solar Cycle 20 <i>P. S. McIntosh</i>	25
4.	A Two-Level Solar Dynamo Based on Solar Activity, Convection, and Differential Rotation <i>A. Bratenahl, P. J. Baum and W. M. Adams</i>	29
5.	Location of Compact Microwave Sources with Respect to Concentrations of Magnetic Field in Active Solar Regions <i>V. Gaizauskas and K. F. Tapping</i>	33
6.	Radio Observations of Coronal Holes <i>K. V. Sheridan and G. A. Dulk</i>	37
7.	A Model for the North Coronal Hole Observed at the 1973 Eclipse, Between 1.3 and 3.2 R <sub>☉</sub> <i>F. Crifo and J.-P. Picat</i>	45
8.	On the Possibility of Identifying Coronal Holes on Synoptic Maps of the Green Corona <i>V. Letfus, L. Kulčár and J. Šykora</i>	49
9.	Solar Observations with a New Earth-Orbiting Coronagraph <i>N. R. Sheeley, Jr., R. A. Howard, D. J. Michels and M. J. Koomen</i>	55
10.	X-Ray Structures Associated with Disappearing H $\alpha$ Filaments in Active Regions <i>S. W. Kahler</i>	61
11.	The Origin of Interplanetary Sectors <i>K. H. Schatten</i>	67
12.	Coronal Structure and Solar Wind <i>J. N. Tandon</i>	73

13.	Solar Polar Field Reversals and Secular Variation of Cosmic Ray Intensity <i>H. S. Ahluwalia</i>	79
<b>PART II. CORONAL AND INTERPLANETARY RESPONSES TO LONG TIME SCALE PHENOMENA</b>		
14.	The Coronal Responses to the Large-Scale and Long-Term Phenomena of the Lower Layers of the Sun (invited) <i>J. Sykora</i>	87
15.	Interplanetary Response to Solar Long Time-Scale Phenomena (invited) <i>C. D'Uston and J. M. Bosqued</i>	105
16.	Stellar Mass Flux and Coronal Heating by Shock Waves <i>P. Couturier, A. Mangeney and P. Souffrin</i>	127
17.	Reflexion and Transmission of Alfvén Waves in an Atmosphere <i>N. Bel and B. Leroy</i>	131
18.	Solar Radar Observations <i>A. O. Benz</i>	135
19.	Mode-Coupled MHD Waves in the Corona and Solar Wind <i>M. Heinemann and S. Olbert</i>	139
20.	Properties of Magnetohydrodynamic Turbulence in the Solar Wind <i>M. Dobrowolny, A. Mangeney and P. L. Veltri</i>	143
21.	An Empirical Relation Between Density, Flow Velocity and Heliocentric Distance in the Solar Wind <i>M. Eyni and R. Steinitz</i>	147
22.	Are Solar Wind Measurements of Different Spacecraft Consistent? <i>R. Steinitz and M. Eyni</i>	151
23.	Observation of Dust Generated Hydrogen in the Solar Vicinity <i>H. J. Fahr, H. W. Ripken and G. Lay</i>	155
24.	Model Calculations of Solar Wind Expansion Including an Enhanced Fraction of Ionizing Electrons <i>E. F. Petelski, H. J. Fahr and H. W. Ripken</i>	159
25.	Correlated Variations of Planetary Albedos and Solar-Interplanetary Parameters <i>G. W. Lockwood, S. T. Suess and D. T. Thompson</i>	163

26.	Large-Scale Magnetic Field Structure at the Earth's Orbit, Its Correlation with Solar Activity and Orientation and Motion of the Solar System in the Galaxy <i>G. J. Vassilyeva, M. A. Kuznetsova and L. M. Kotlyar</i>	167
<b>PART III. SOLAR TRANSIENT PHENOMENA AFFECTING THE CORONA AND IN- TERPLANETARY MEDIUM: DYNAMICS DEDUCED FROM OBSERVATIONS</b>		
27.	Energy and Mass Injected by Flares and Eruptive Prominences (invited) <i>O. Engvold</i>	173
28.	X-Ray Evidence of Coronal Preflare Emission <i>D. F. Webb</i>	189
29.	Spicules and Macrospicules <i>W. van Tend</i>	195
30.	UV Emitting Spicules <i>G. Poletto</i>	199
31.	On a Peculiar Type of Filament Activation <i>A. Bruzek</i>	203
32.	The Filament Eruption in the 3B Flare of July 29, 1973: Onset and Magnetic Field Configuration <i>R. L. Moore and B. J. LaBonte</i>	207
33.	Dynamics of a Quiescent Filament <i>B. Schmieder, M. Martres, P. Mein and I. Soru-Escaut</i>	213
34.	Particle Acceleration in the Process of Eruptive Opening and Reconnection of Magnetic Fields <i>Z. Švestka, S. F. Martin and R. A. Kopp</i>	217
35.	On the Thermalisation of Flare-Time Energetic Electrons Observed at Radio and X-Ray Wavelengths <i>S. S. Degaonkar, H. S. Sawant and R. V. Bhonsle</i>	223
36.	Recent Observations of Energetic Electrons in Solar Flares <i>S. R. Kane</i>	227
37.	An Energy Storage Process and Energy Budget of Solar Flares <i>K. Tanaka, Z. K. Smith and M. Dryer</i>	231
38.	Flare Associated Eruptive Prominence Activity of February 1, 1979 <i>A. Bhatnagar, R. M. Jain, D. B. Jadhav and R. N. Shelke</i>	235

39.	The Disruption of EUV Coronal Loops Following a Mass Ejection Transient <i>E. J. Schmahl</i>	241
40.	Decameter Radio and White Light Observations of the 21 August 1973 Coronal Transient <i>T. E. Gergely and M. R. Kundu</i>	245
41.	Radio Data and Computer Simulations for Shock Waves Generated by Solar Flares <i>A. Maxwell and M. Dryer</i>	251
42.	Estimation of Shock Thickness from Dynamic Spectra of Type II Bursts <i>H. S. Sawant, S. S. Degaonkar, S. K. Alurkar and R. V. Bhonsle</i>	257
43.	Evidence for Open Field Lines from Active Regions: Short Communication <i>K. V. Sheridan</i>	261
<b>PART IV. SOLAR TRANSIENT PHENOMENA AFFECTING THE CORONA AND INTERPLANETARY MEDIUM: - THEORETICAL CONSIDERATIONS</b>		
44.	MHD Aspects of Coronal Transients (invited) <i>U. Anzer</i>	263
45.	Flare Model with Force-Free Fields and Helical Symmetry <i>D. K. Callebaut</i>	279
46.	The False Equilibrium of a Force-Free Magnetic Field <i>B. C. Low</i>	283
47.	Energy Storage and Instability in Magnetic Flux Tubes <i>T. Sakurai</i>	291
48.	The Filament Instability in a Sheared Field <i>C. Chiuderi and G. Van Hoven</i>	295
49.	A Model for Impulsive Electron Acceleration to Energies of Tens of $kT_e$ <i>P. Hoyng, A. Duijveman, Th. F. J. van Grunsven and D. R. Nicholson</i>	299
50.	A Model Flare and the Continued Post-Flare Mass Release from the Flare Region <i>Y. Uchida</i>	303
51.	A Model of Surge <i>G. Noci</i>	307

## TABLE OF CONTENTS

ix

52.	Radiative Hydrodynamics of Flares: Preliminary Results and Numerical Treatment of the Transition Region <i>A. N. McClymont and R. C. Canfield</i>	313
53.	Reconnection Driven Coronal Transients <i>G. W. Pneuman</i>	317
54.	Coronal Propagation of an MHD Shock in the Vicinity of a Magnetic Neutral Sheet <i>D. J. Mullan and R. S. Steinolfson</i>	323
55.	Two-Fluid Theory of Interplanetary Shock Waves <i>P. Rosenau</i>	327
<b>PART V. CORONAL AND INTERPLANETARY RESPONSES TO SHORT TIME SCALE PHENOMENA: - OBSERVATIONS</b>		
56.	Transient Disturbances of the Outer Corona (invited) <i>R. T. Stewart</i>	333
57.	Transient Phenomena Originating at the Sun-An Interplanetary View (invited) <i>D. S. Intriligator</i>	357
58.	Measurements of Mass Flow in the Transition Region and Inner Corona <i>G. J. Rottman</i>	375
59.	The Association of Type III Bursts and Coronal Transient Activity <i>B. V. Jackson, G. A. Dulk and K. V. Sheridan</i>	379
60.	Recent Very Bright Type IV Solar Metre-Wave Radio Emissions <i>R. A. Duncan, R. T. Stewart and G. J. Nelson</i>	381
61.	The Solar Mass Ejection of 8 May 1979 <i>D. J. Michels, R. A. Howard, M. J. Koomen, N. R. Sheeley, Jr. and B. Rompolt</i>	387
62.	Variations of Interplanetary Parameters and Cosmic-Ray Intensities <i>A. Geranios</i>	393
63.	Two Classes of Fast Solar Wind Streams: Their Origin and Influence on the Galactic Cosmic Ray Intensity <i>N. Iucci, M. Parisi, M. Storini and G. Villaresi</i>	399
64.	A Large Decametric Wavelength Antenna Array for IPS Observations of Radio Sources <i>Ch. V. Sastry</i>	403

65.	Interplanetary Scintillation-Preliminary Observations at 103 MHz <i>S. K. Alurkar and R. V. Bhonsle</i>	405
66.	IPS Observations of Flare-Generated Disturbances <i>T. Watanabe</i>	409
67.	MAGALERT: August 27, 1978 <i>J. A. Joselyn and J. F. Bryson, Jr.</i>	413
68.	Classification and Investigation of Solar Flare Situations Conformably to Interplanetary and Magnetospheric Disturbances <i>K. G. Ivanov, N. V. Mikerina and L. V. Evdokimova</i>	421
<b>PART VI. CORONAL AND INTERPLANETARY RESPONSES TO SHORT TIME SCALE PHENOMENA: - THEORETICAL CONSIDERATIONS</b>		
69.	Physical Driving Forces and Models of Coronal Responses (invited) <i>S. I. Syrovatskii and B. V. Somov</i>	425
70.	Theoretical Interpretation of Travelling Interplanetary Phenomena and Their Solar Origins (invited) <i>S. T. Wu</i>	443
71.	Physical Processes and Models of Interplanetary Responses: Suggested Theoretical Studies (invited) <i>S. Cuperman</i>	459
72.	The Cross Sectional Magnetic Profile of a Coronal Transient <i>M. K. Bird, H. Volland, B. L. Seidel and C. T. Stelzried</i>	475
73.	Evolution of Coronal Magnetic Structures <i>R. S. Steinolfson and S. T. Wu</i>	483
74.	Magnetically Driven Motions in Solar Corona <i>B. V. Somov and S. I. Syrovatskii</i>	487
75.	Gasdynamics of Impulsive Heated Solar Plasma <i>B. J. Sermulina, B. V. Somov, A. R. Spektor and S. I. Syrovatskii</i>	491
76.	Dynamics of Coronal Transients: Two-Dimensional Non-Plane MHD Models <i>Y. Nakagawa, S. T. Wu and S. M. Han</i>	495
77.	Observations of Interplanetary Scintillation and a Theory of High-Speed Solar Wind <i>H. Washimi, T. Kakinuma and M. Kojima</i>	499

78. Global Modeling of Disturbances in the Corona-Interplanetary Space <i>T. Yeh</i>	503
PART VII. FUTURE DIRECTIONS	
79. The OPEN Program: An Example of the Scientific Rationale for Future Solar-Terrestrial Research Programs (invited) <i>D. J. Williams</i>	507
80. A Program for the Observations of the Sun and Heliosphere from Space 1980-1995 (invited) <i>J. D. Bohlin and E. G. Chipman</i>	523
81. Proposal for an Interplanetary Mission to Sound the Outer Regions of the Solar Corona <i>H. Porsche, H. Volland, M. K. Bird and P. Edenhofer</i>	541
PART VIII. SUMMARY OF SYMPOSIUM NO. 91	
82. Solar and Interplanetary Dynamics (Symposium Summary) <i>M. Kuperus</i>	547
<i>Subject Index</i>	553