

TABLE OF CONTENTS

| | |
|--|------|
| Preface | xi |
| The Organizing Committees | xii |
| List of Participants | xiii |
| <u>Introductory remarks</u> | |
| D. SUGIMOTO: Symposium on Fundamental Problems in the Theory of Stellar Evolution | 1 |
| <u>Session 1: STAR FORMATION IN ROTATING AND MAGNETIC GAS CLOUDS</u> Chairman; W.M. TSCHARNUTER | |
| <u>Review papers</u> | |
| P. BODENHEIMER: The Effects of Rotation during Star Formation | 5 |
| T.Ch. MOUSCHOVIAS: The Role of Magnetic Fields in the Forma- tion of Stars | 27 |
| <u>Contributed papers</u> | |
| T. NAKANO: Quasistatic Contraction of Magnetic Protostars due to Magnetic Flux Leakage | 63 |
| T. UMEBAYASHI and T. NAKANO: Role of Grains in the Drift of Plasma and Magnetic Field in Dense Interstellar Clouds | 65 |
| M. KONDO: On the Correspondence of OH/H ₂ O Maser Sources to the Stage of Proto-Star Formation | 66 |
| Y. YOSHII and Y. SABANO: On the Star Formation in Early Stage of Galactic Evolution | 68 |
| H. KIMURA and C.P. LIU: On the Structure and Evolution of Massive Interstellar Clouds | 70 |
| Y. SABANO and Y. SOFUE: Chain-Reacting Thermal Instability and its Implication on Star-Formation in Interstellar CO Clouds | 72 |

| | |
|--|-----|
| S. IKEUCHI: Global Structure of Interstellar Medium and Star Formation Rate | 73 |
| <u>Session 2: PRE-MAIN-SEQUENCE EVOLUTION AND FORMATION OF BINARY STARS</u> Chairman; S-A. SØRENSEN | |
| <u>Review papers</u> | |
| L.B. LUCY: The Formation of Binary Stars | 75 |
| G.S. BISNOVATYI-KOGAN: Pre-Main-Sequence Stellar Evolution (read by A.G. MASSEVITCH) | 85 |
| <u>Contributed papers</u> | |
| S. ISOBE and G. SASAKI: Age Spread of the Orion Nebular Stars | 99 |
| N. UKITA: Monitor Observations of the Orion SiO Maser | 100 |
| V.A. AMBARTSUMIAN and L.V. MIRZOYAN: An Observational Approach to the Early Stages of Stellar Evolution | 101 |
| S-A. SØRENSEN, S. NARITA and D. McNALLY: Fragmentation of Collapsing Gas Clouds | 103 |
| W.M. TSCHARNUTER: Accumulation of a Rapidly Rotating Protostar and the Formation of an Associated Nebula as a Result of Angular Momentum Transport by Turbulent Friction | 105 |
| R.A. GINGOLD and J.J. MONAGHAN: Fragmentation of Isothermal Gas Clouds | 107 |
| R.H. DURISEN and J.E. TOHLINE: Numerical Studies of the Fission Hypothesis for Rotating Polytropes | 109 |
| K-Y. CHEN: Pre-Main-Sequence Evolution of Close Binaries with Mass Transfer | 111 |
| G.S. BISNOVATYI-KOGAN and S.A. LAMZIN: Chromospherical and Coronal Phenomena in Young Contracting Stars (read by A.V. TUTUKOV) | * |
| <u>Session 3: ORIGIN OF THE SOLAR SYSTEM</u> Chairman; E. SCHATZMAN | |
| <u>Review paper</u> | |
| C. HAYASHI: Formation of the Planets | 113 |

Contributed papers

| | |
|---|-----|
| T.V. RUZMAIKINA: On the Angular Momentum of Presolar Nebula (read by A.V. TUTUKOV) | * |
| L. MESTEL: Magnetic Braking, the Solar Nebula and the Cometary Cloud | 129 |
| Y. NAKAGAWA, K. NAKAZAWA and C. HAYASHI: Growth and Sedimentation of Dust Grains in the Primordial Solar Nebula | 131 |
| H. MIZUNO: Formation of the Giant Planets | 133 |
| M. SEKIYA, K. NAKAZAWA and C. HAYASHI: Dissipation of the Primordial Terrestrial Atmosphere due to Irradiation of Solar EUV | 135 |

Session 4: MASS EXCHANGE ON CLOSE BINARY STARS AND THE EFFECT ON STELLAR EVOLUTION
Chairman; C. de LOORE

Review papers

| | |
|---|-----|
| A.V. TUTUKOV: Evolution of Close Binaries | 137 |
| E.P.J. van den HEUVEL: The Formation of Compact Objects in Binary Systems | 155 |

Contributed papers

| | |
|--|-----|
| B.W. BOPP and S.M. RUCIŃSKI: The Rapidly Rotating Giants of the FK Comae-type | 177 |
| D. Ya. MARTYNOV: RX Cassiopeiae -- A Binary System with Rapid Evolution (read by A.G. MASSEVITCH) | * |
| Y. KONDO and G.E. McCLUSKEY: Patterns of Mass Flow in Close Binaries Based on Ultraviolet Observations (read by K. NOMOTO) | * |
| W. PACKET: Rotation and the Evolution of the Mass-Accreting Component in Close Binary Systems | 179 |
| O. VILHU and T. RAHUNEN: Contact Binary Evolution and Angular Momentum Loss | 181 |
| D. VANBEVEREN: Non-conservative Evolution of Massive O-Type Close Binaries with Galactic and with Magellanic Cloud Chemical Abundances | 183 |

| | |
|--|-----|
| J.P. de CUYPER: Asymmetric Supernova Explosions: The Missing Link between Wolf-Rayet Binaries, Run-Away OB Stars and Pulsars | 184 |
| A.G. MASSEVITCH, A.V. TUTUKOV and L.R. YUNGELSON: Evolution of Low Mass Binaries under the Influence of Gravitational Radiation | 185 |
| J.C. WHEELER, H. SAIO and M. BREGER: Blue Stragglers as Long-Lived Stars | 187 |
| <u>Session 5: MASS-ACCRETION ONTO COMPACT STARS AND RESULTANT EXPLOSIVE PHENOMENA AND NUCLEOSYNTHESIS</u> Chairman; A.G. MASSEVITCH | |
| <u>Review papers</u> | |
| D. SUGIMOTO and S. MIYAJI: Generalized Theory of Shell Flash and Accreting White Dwarfs | 191 |
| P.C. JOSS: Thermonuclear Processes on Accreting Neutron Stars | 207 |
| <u>Contributed papers</u> | |
| S. MIYAJI, M.Y. FUJIMOTO and T. HANAWA: Shell-Flashes on Accreting Neutron Stars and Mode Profiles of Type-I X-Ray Bursts | 229 |
| E.V. ERGMA and A.D. KUDRYASHOV: On Hydrogen Burning in High Temperature and Density Evolution (R-P Process) (read by A.V. TUTUKOV) | * |
| G.S. BISNOVATYI-KOGAN and V.M. CHECHETKIN: Formation of Heavy Elements at the Outbursts from the Neutron Stars | * |
| S. TSURUTA, T. MURAI, K. NOMOTO and N. ITOH: The Current Status of Neutron Star Cooling Theories | 231 |
| E.E. SALPETER: Cyclotron Line Emission from Accretion onto a Magnetized Neutron Star | 233 |
| G.J. WEAST, R.H. DURISEN, J.N. IMAMURA, N.D. KYLAFIS and D.Q. LAMB: Effects of Nuclear Burning on X-Ray and UV Emission from Accreting Degenerate Dwarfs | 234 |
| F. TAKAHARA: Comptonized X-Ray Emission from the Accretion Disk around a Massive Black Hole | 235 |

Session 6: EFFECT OF ROTATION AND MAGNETIC FIELD
IN STELLAR EVOLUTION
Chairman; E.E. SALPETER

Review papers

- R. KIPPENHAHN and H.-C. THOMAS: Rotation and Stellar Evolution 237
- L. MESTEL: Magnetic Fields and Stellar Evolution 257

Contributed papers

- M.P. SAVEDOFF: Progress towards a Quasistatic Two Dimensional Rotation Code (read by K. NOMOTO) *
- T. FUKUSHIMA, Y. ERIGUCHI, D. SUGIMOTO and G.S. BISNOVATYI-KOGAN: Concave Hamburger Equilibrium of Rotating Bodies 273
- Y. ERIGUCHI: Rapidly Rotating and Fully General Relativistic Polytropes 274
- V. CASTELLANI: The Influence of Rotation on Horizontal Branch Stars and on RR Lyrae Pulsational Properties 275
- K. NARIAI: Can Stellar Atmospheres be in Quasi-Static Equilibrium in the Presence of Magnetic Fields ? 276
- Y. OSAKI and G. GONCZI: Influence of Convection on the Pulsational Stability of Stars 278
- D.R. XIONG: A Statistical Theory of Non-local Convection in Chemical Inhomogeneous Star (read by H. KIMURA) *
- W. UNNO, T. NAKANO and M. KONDO: Viscosity, Thermal and Electrical Conductivities in Turbulent Convection 280
- E. SCHATZMAN: On the Presence of Turbulent Diffusion in Stars and its Effect on Stellar Evolution 281
- N. ARIMOTO and M. SIMODA: On the Number Ratio of Horizontal Branch Stars to Red Giant Stars in Globular Clusters 284

Session 7: SUPERNOVA EXPLOSIONS LEADING TO THE FORMATION
OF NEUTRON STARS AND BLACK HOLES
Chairman; O. VILHU

Review papers

- J.C. WHEELER: Supernovae: Progenitor Stars and Mechanisms 285

| | |
|--|-----|
| K. NOMOTO: Supernova Explosions in Degenerate Stars -- Detonation, Deflagration and Electron Capture -- | 295 |
| <u>Contributed papers</u> | |
| H.J. HAUBOLD and R.W. JOHN: A New Approach to the Analytic Evaluation of Thermonuclear Reaction Rates | 317 |
| N. ITOH, H. TOTSUJI, S. ICHIMARU and H.E. DeWITT: Enhancement of Thermonuclear Reaction Rate due to Strong Screening | 318 |
| V.M. CHECHETKIN: The Neutronization of the Matter and Hydro- dynamic Instability at Final Stages of Stellar Evolution | 320 |
| R. MOCHKOVITCH: Non-Explosive Collapse of White Dwarfs (read by E. SCHATZMAN) | * |
| T.J. MAZUREK: Stellar Collapse and Nascent Neutron Stars | 322 |
| T. NAKAMURA, K. MAEDA, S. MIYAMA and M. SASAKI: General Rela- tivistic Collapse of an Axially Symmetric Star Leading to the Formation of Neutron Stars and Black Holes | 326 |
| K. ARAI and K. KAMINISHI: Stability against Radial Perturba- tions of Slowly Rotating Neutron Stars | 327 |
| <u>Session 8: GENERAL DISCUSSIONS</u> Chairman; S. HAYAKAWA | |
| <u>Rapporteur talks</u> | |
| R.J. TAYLER: Concluding Remarks | 329 |
| E.E. SALPETER: Comments and Impressions | 335 |
| <u>General discussions</u> | |
| C. HAYASHI: (included in general discussions) | 339 |
| AUTHOR INDEX | 343 |
| SUBJECT INDEX | 345 |

