

COMPOSITION, ORIGIN AND PREHISTORY

CONTENTS

COMPOSITIONSESSION I

Page

3- 1.	Light, Medium and Heavy Nuclei in the Primary Spectrum in 1963 at Minneapolis	W.R. Webber J. Ornes	3
3- 2.	A study of the Multiply Charged Nuclei of the Primary Cosmic Equator using Nuclear Emulsions - Part I: Fragmentation Parameters in Graphite	G.D. Badhwar N. Durgaprasad B.Vijayalakshmi	8
3- 3.	A Study of the Multiply Charged Nuclei of the Primary Cosmic Radiation near the Geomagnetic Equator using Nuclear Emulsions - Part II: Chemical Composition of the Primary Cosmic Ray Nuclei of Charge $Z \geq 6$.	G.D. Badhwar N.Durgaprasad B. Vijayalakshmi	15
3- 4.	A Study of Multiply Charged Nuclei of the Primary Cosmic Radiation near the Geomagnetic Equator using Nuclear Emulsions - Part III: The Light Nuclei of the Cosmic Radiation	N. Durgaprasad	17
3- 5.	Flux and Energy Spectra of Heavy Primary Nuclei Measured on Polar Orbiting Satellites	H. Yagoda K. Fukni	24
3- 6.	Study of the Relative Abundance of the Primary Cosmic Ray Nuclei with $Z \geq 26$	G. Alvial J. Riquelme	32
3- 7.	Energy Spectrum of Heavy Nuclei of Primary Cosmic Rays from simultaneous Flights from Texas, USA and Hyderabad, India	G.D.Budhwar S. Biswas R.R. Daniel N.Durgaprasad	38
3- 8.	Cosmic Ray Nucleus Component Investigation Performed on Soviet Satellites and Probes	V.L. Ginzburg L.V. Kuznetsov V.I. Lagacnev L.A. Razarenov M.I. Fradkin	41

SESSION II

5-9.	Changes in the Primary Cosmic Ray Proton Spectrum in 1962 and 1963	P. Meyer R. Vogt	49
5-10.	The Primary Cosmic Ray Proton Flux over Hyderabad, India	V.L. Bhatt R.R. Daniel	56
5-11.	The Energy Spectrum of Primary Cosmic Ray Protons of Energy 5-15 GeV from simultaneous Flights made from Texas USA and Hyderabad, India	R.R. Daniel N. Sreenivasan	60
5-12.	The Flux of Primary Cosmic Ray Deuterons at a Geomagnetic Latitude of 7.6° N.	S.N. Ganguli N. Kameswara Rao M.S. Swami	65
5-13.	Low Energy Protons, Deuterium and Alpha Particles in the Primary Spectrum in 1963 at Ft. Churchill and Minneapolis	W.R. Webber J. Ornes	69
5-14.	Cosmic Ray Intensity at Thule, Greenland and its Relation to Data from Mariner II	H.V. Neher H.R. Anderson	76

SESSION III

3-15.	Isotopic Abundance of Carbon Nuclei in Primary Cosmic Rays	H. Hasegawa H. Aisu K. Ito	85
3-16.	On the Isotopic Composition of Hydrogen Nuclei in Low Energy Primary Cosmic Radiation	H. Hasegawa S. Nakagawa E. Tamai	86
3-17.	Isotopic Abundance of Helium Nuclei in Primary Cosmic Radiation	H. Aisu	90
3-18.	The Isotopic Composition and the Energy Helium Nuclei in Primary Cosmic Radiation	M.V.K. Appa Rao C. Dahanayake M.F. Kaplan P.J. Lavakare	95

3-19.	The Helium Isotopes in the Primary Cosmic Radiation	B.Hildebrand F.W. O'Dell M.M. Shapiro R. Silberberg B. Stiller	101
3-20.	An Attempt to Determine the Isotopic Composition of High Energy Helium Nuclei in the Primary Cosmic Radiation	V.K.Balasubramanyan S.V. Damle G.S. Gokhale M.G.K. Menon S.K. Roy	110
3-21.	Determination of Carbon Isotopes in the Primary Cosmic Rays	G. Alvia	116
3-22.	A Measurement of Low Energy Cosmic Ray Protons	K.A. Brunstein	120

ELECTRONS AND PHOTONS

SESSION I

3-23.	Electrons and Photons in the Primary Cosmic Rays	S. Hayakawa	125
3-24.	The Ratio of Electrons to Positrons in the Primary Cosmic Rays	J.A.De Shong Jr. R.H.Hildebrand P. Meyer	153
3-25.	Some Problems in Connection with Galactic Electrons	N. Lund B. Swanenburg Y. Tanaka A.H. Wapstra	163
3-26.	Investigation of Primary Electrons at 46° Geomagnetic Latitude	B. Agrinier Y. Koechlin B. Parlier G. Boella G. Degli Antoni C. Dilworth L. Scarsi C. Sironi	167

SESSION II

3-27.	Gamma and x-Radiation Connected with the Galactic and Metagalactic Cosmic Rays	V.L. Ginsburg S.I. Syrovatsky	177
3-28.	Cosmic Gamma Ray Results from Explorer XI	W.L. Kraushaar G.W. Clark M. Agagino G. Garrine H. Holmken P. Higbie	184
3-29.	Investigation of Primary Gamma Rays	E.M. Hafner J.G. Duthie M.F. Kaplan G. Share	190
3-30.	100 Channels, 0.1 to 2 MeV Gamma- Spectrometer of the Earth's Atmos- phere between 0 and 160 km	D. Boclet A. Ducros J. Labeyrie R. Rocchia	194
3-31.	Gamma-Ray Spectrometer for Balloon Flights	D. Kohn K. Finkau G. Wibberenz	203
3-32.	x-Ray Production in Supernova Remnants	G. Clark M. Oda	206
3-33.	Possible Local Sources of Galactic x-Rays	S. Hayakawa M. Matsuka	213
	General Discussion on Composition		219

ORIGIN

SESSION I

- 3-34. The Production of Cosmic Rays in Violent Events in Galaxies G. Burbidge 229
- 3-35. The Origin of Cosmic Rays V.L. Ginsburg 301
S.I.Syrovatsky

SESSION II

- 3-36. Cosmic Rays from Large Supernovae S.A. Colgate 335
R.H. White
- 3-37. Cosmic Ray Energy Spectrum and High-Energy Particles in Supernova H. Sato 360
- 3-38. Possible Anisotropy of Cosmic Rays with Respect to a Spiral Arm S. Hayakawa 364
H. Obayashi
S. Sakakibara
- 3-39. On the Configuration of Relativistic Particles Generated by a Supernova in the Galactic Arm and an Interpretation of the Radio Spur M. Oda 370
H. Hasegawa

SESSION III

- 3-40. Cosmic Ray Equilibrium W.L.Kraushaar 379
- 3-41. Results of Calculation of Energy Spectrum of Galactic Cosmic Rays A.N.Charkhchyan 384
T.N.Charakhchyan
- 3-42. Transformation in the Composition of the Galactic Cosmic Radiation during its Traversal in Space G.D. Badhwar 390
R.R. Daniel
B.Vijayalakshzi

3-43.	Primary Cosmic Radiation of Ultra High Energy	G.B.Kristiansen A.T. Abrosimov V.B.Atrashkevich G.V. Kulikov B.I. Solovyova J.A. Fomin B.A. Kchrenov	395
-------	--	--	-----

3-44.	Secondary Galactic Electrons	F.C. Jones	399
-------	------------------------------	------------	-----

SESSION IV

	General Discussion on Origin of Cosmic Rays		407
--	--	--	-----

PAPERS NOT READ AT THE CONFERENCE

3-45.	On the Rotation of Cosmic Ray Anisotropy	A.M. Altukhov A.I. Kuzmin G.F. Krinsky G.V. Skripin N.P. Chirkov	421
-------	---	--	-----

COSMIC RAY HISTORY BASED

ON ISOTOPE STUDIES

SESSION I

3-46.	Introductory Remarks (Discussion)	J.R. Arnold	431
3-47.	Experimental Evidence on the History of Cosmic Radiation	J. Geiss	434
3-48.	Introduction of Systematic Studies of the Variation of C ¹⁴ - Contents in the Atmosphere for the Past Thousand Years	K. Kigoshi H. Hasegawa K. Yamakoshi M. Oda S. Shibota K. Saito	466

SESSION II

3-49.	Cosmic Ray Data Derived from Isotope Studies in Meteorite	H. Wanke	473
3-50.	The Temporal and Spatial Variation in Cosmic Rays	O.A.Schaeffer R. Davis Jr. R.W. Stoenner D. Heymann	480
3-51.	Solar Surface Nuclear Reactions	E.L. Fireman	487
	Concluding Remarks	B. Peters	504
	Author Index		509