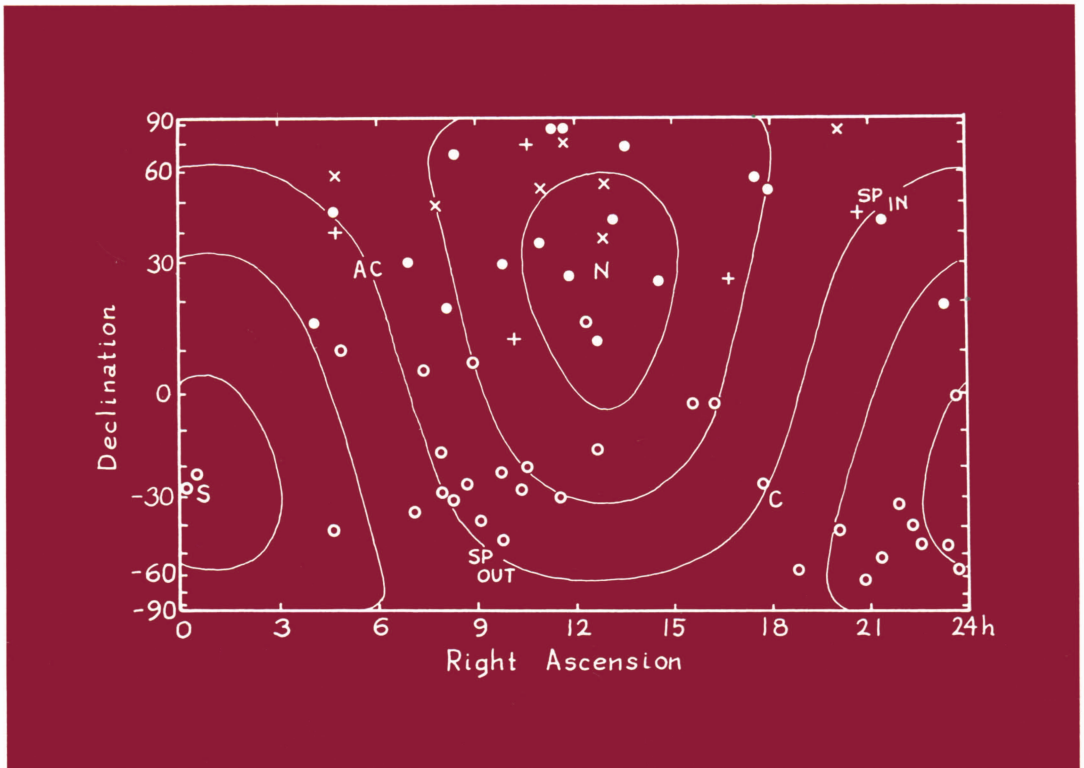


INTERNATIONAL ASTRONOMICAL UNION

SYMPOSIUM No. 94

ORIGIN OF COSMIC RAYS

Edited by G. SETTI, G. SPADA, and A. W. WOLFENDALE



INTERNATIONAL ASTRONOMICAL UNION

D. REIDEL PUBLISHING COMPANY / DORDRECHT : HOLLAND

BOSTON : U.S.A. / LONDON : ENGLAND



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For several decades cosmic ray research has concentrated on the *nuclear* physical aspects of the particle beam and many important discoveries were made, notably the identification of the positron, the muon, the pion and the strange particles. More recently, however, emphasis has shifted to the *astrophysical* aspect both with regard to the origin of the radiation and to its relation with the other radiation fields.

These collected papers are the outcome of a symposium planned to bring together workers in all the various astronomical fields - from Radio, through Optical to Gamma Rays - with Cosmic Ray physicists and to fully explore the various interrelations.

Virtually all the papers presented are reproduced here and additional short papers and resumés have also been included so that this volume represents the most up-to-date contribution available in book form.

D. REIDEL PUBLISHING COMPANY
DORDRECHT : HOLLAND / BOSTON : U.S.A.
LONDON : ENGLAND

ORIGIN OF COSMIC RAYS

INTERNATIONAL ASTRONOMICAL UNION
UNION ASTRONOMIQUE INTERNATIONALE

SYMPOSIUM No. 94
JOINTLY WITH INTERNATIONAL UNION OF
PURE AND APPLIED PHYSICS
HELD IN BOLOGNA, ITALY, JUNE 11–14, 1980

ORIGIN OF COSMIC RAYS

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D. REIDEL PUBLISHING COMPANY

DORDRECHT : HOLLAND / BOSTON : U.S.A. / LONDON : ENGLAND



Library of Congress Cataloging in Publication Data

CIP

Main entry under title:

Origin of cosmic rays.

At head of title: International astronomical union; Union astronomique internationale.

I. Cosmic rays-Congresses. I. Setti, Giancarlo, 1935-
II. Spada, Gianfranco. III. Wolfendale, A. W. IV. International astronomical union.

QC485.8.07074 523.01'97223 81-2574

ISBN 90-277-1271-9 AACR2

ISBN 90-277-1272-7 (pbk.)

*Published on behalf of
the International Astronomical Union
by
D. Reidel Publishing Company, P. O. Box 17, 3300 AA Dordrecht, Holland*

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*Sold and distributed in the U.S.A. and Canada
by Kluwer Boston Inc.,
190 Old Derby Street, Hingham, MA 02043, U.S.A.*

*In all other countries, sold and distributed
by Kluwer Academic Publishers Group,
P. O. Box 322, 3300 AH Dordrecht, Holland*

D. Reidel Publishing Company is a member of the Kluwer Group.

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Printed in The Netherlands

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PREFACE

The cosmic radiation was discovered by Hess in 1912 but its origin is still the subject of much controversy and considerable study. For several decades most workers in the cosmic ray field were interested in the Nuclear Physical aspect of the particle beam and many important discoveries were made, notably the identification of the positron, the muon, the pion and the strange particles. More recently however, emphasis has changed to the Astrophysical aspect both with regard to the origin of the radiation and to its relation with the other radiation fields.

Mindful of the increasing importance of the Astrophysical facets of the subject the Cosmic Ray Commission of IUPAP approached the High Energy Astrophysics Commission of the IAU with the suggestion of a joint Symposium on Cosmic Ray Origin. The plan was to bring together workers in all the various astronomical fields - from Radio, through Optical to Gamma Rays - with Cosmic Ray physicists and to fully explore the various interrelations. The approach was received with enthusiasm and this book contains the proceedings of the ensuing Symposium, (styled IUPAP/IAU Symposium No. 94) which was held in Bologna from 11th - 14th June 1980. Virtually all the papers presented are reproduced here.

The Scientific Organizing Committee chose the invited speakers whose papers formed the major scientific component of the meeting. Additional short contributed papers were also called for and very brief 2-page resumés (which have not been refereed) are given in the proceedings.

The Symposium was sponsored by IAU, IUPAP and the National Research Council of Italy and to these bodies the organisers express their grateful thanks. The organisers are also very indebted to the Mayor of Bologna for the warm reception offered to the participants and for permission to use the "Stabat Mater" Aula for the opening session of the Symposium. The organizers wish to express their gratitude to the secretarial staff, especially to Miss Pia Tamborrino, of the T.E.S.R.E. Institute for their invaluable help offered in the organization of the meeting.

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