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Cosmic Explosions

On the 10th Anniversary of SN1993J (IAU Colloquium 192)

Springer

https://doi.org/10.1017/S0252921100008915 Published online by Cambridge University Press

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With 199 Figures and 15 color plates

Springer

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ISSN 0930-8989

ISBN 3-540-23039-4 Springer Berlin Heidelberg New York

Library of Congress Control Number: 2004111216

Springer is a part of Springer Science+Business Media

springeronline.com

Printed in Germany

Typesetting by the authors/editors
Cover concept: eStudio Calamar Steinen
Cover production: *design & production* GmbH, Heidelberg

Printed on acid-free paper 62/3141/ts 5 4 3 2 1 0

Preface

Supernovae are among the most energetic phenomena in the Universe and related to almost all aspects of modern astrophysics including starburst galaxies, cosmic ray acceleration, neutron star and black hole formation, nucleosynthesis and ISM chemical enrichment, energy input to the ISM, cosmic distance scale determination, dark energy related cosmological acceleration, gamma-ray bursts, extra-solar system neutrino burst detection, gravity wave generation, and many more. Additionally, the past 15 years have been particularly productive with many new results and new understanding due in particular to the closest SN in 400 years in SN 1987A in the Large Magellanic Cloud, and the unusually bright and close SN 1993J and SN 1994I in the nearby galaxies M81 and M51, respectively. In addition, the discovery of the γ-ray burst GRB 980425 and its related supernova SN 1998bw, and the confirmation of GRB 030329/SN 2003dh, tied the study of SNe and GRBs inextricably together. With the many developments since the last major supernova meeting in La Serena, Chile in 1997, we felt that it was an appropriate time to bring together experts and students interested in the subject for a meeting where SN and GRB properties and interrelationships could be discussed. The tenth anniversary of SN 1993J provided such an opportunity and, appropriately, the meeting was held in Spain where SN 1993J was discovered on the early morning of 28 March 1993 by a Spanish amateur astronomer, Francisco García.

The conference covered all aspects of supernova and GRB research: theoretical aspects like nucleosynthesis and explosion mechanisms, progenitor stars, pulsar and SNR formation, interaction with the circumstellar medium, and particle acceleration mechanisms, as well as observational aspects including radio, IR, optical, X-ray, and gamma-ray studies. Cosmology and Dark Energy were also extensively discussed. The conference consisted of 17 reviews, 17 invited talks, 58 contributed papers and 50 posters. Wider public interest in astrophysics in general and supernovae in particular was shown by the large attendance at the excellent open lectures given by the renown scientist, lecturer, and author Sir Martin Rees from Cambridge, UK, by Francisco García from Lugo, Spain, and by the world's most successful amateur supernova hunter, Rev. Robert Evans from Hazelbrook, New South Wales, Australia.

In order to preserve and more widely disseminate the information presented at the meeting, we have prepared the present volume and accompanying CD-ROM. The CD additionally includes poster descriptions and meeting photographs not printed here.

Such a valuable meeting would not have been possible without the support of many people and institutions. There is no way that we can list all the people who contributed to making the meeting a success, but we would particularly like to thank M. Toharia, Director of the Museo de las Ciencias Príncipe Felipe, Prof. F. Tomás, Rector of the Universitat de Valencia, and Prof. J. Quesada, Head of the Oficina de Ciencia y Tecnología de la Generalitat Valenciana. Very special thanks are also due to the members of the Local Organizing Committee and, in particular, to its co-chairman Dr. J. C. Guirado and to the staff of the Museo de las Ciencias.

The conference could not have taken place without the financial and technical support of many Valencian, Spanish, European, American, and international agencies and institutions: Ciudad de las Artes y de las Ciencias de Valencia, Universitat de Valencia, Generalitat Valenciana, Ayuntamiento de Valencia, Ministerio de Ciencia y Tecnología, Consejo Superior de Investigaciones Científicas, Sociedad Española de Astronomía, European Commission, International Astronomical Union, International Union of Radio Science, National Aeronautics and Space Administration, National Science Foundation, American Astronomical Society, and the Naval Research Laboratory all contributed to its success.

We would also like to thank Viajes Iberia Congresos for the efficient conference organization and Springer for the continuous support and patience with the editors of these proceedings. KWW wishes to thank the Office of Naval Research for the 6.1 funding supporting his research.

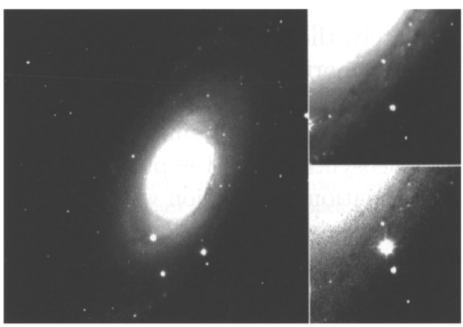

Fig. 1. Photographs (courtesy of Brian P. Schmidt) of the galaxy M81 with SN1993J readily apparent (left), the area of the SN before explosion (right, top), and the area with SN1993J near maximum brightness (right, bottom).

Valencia – Washington, August 2004

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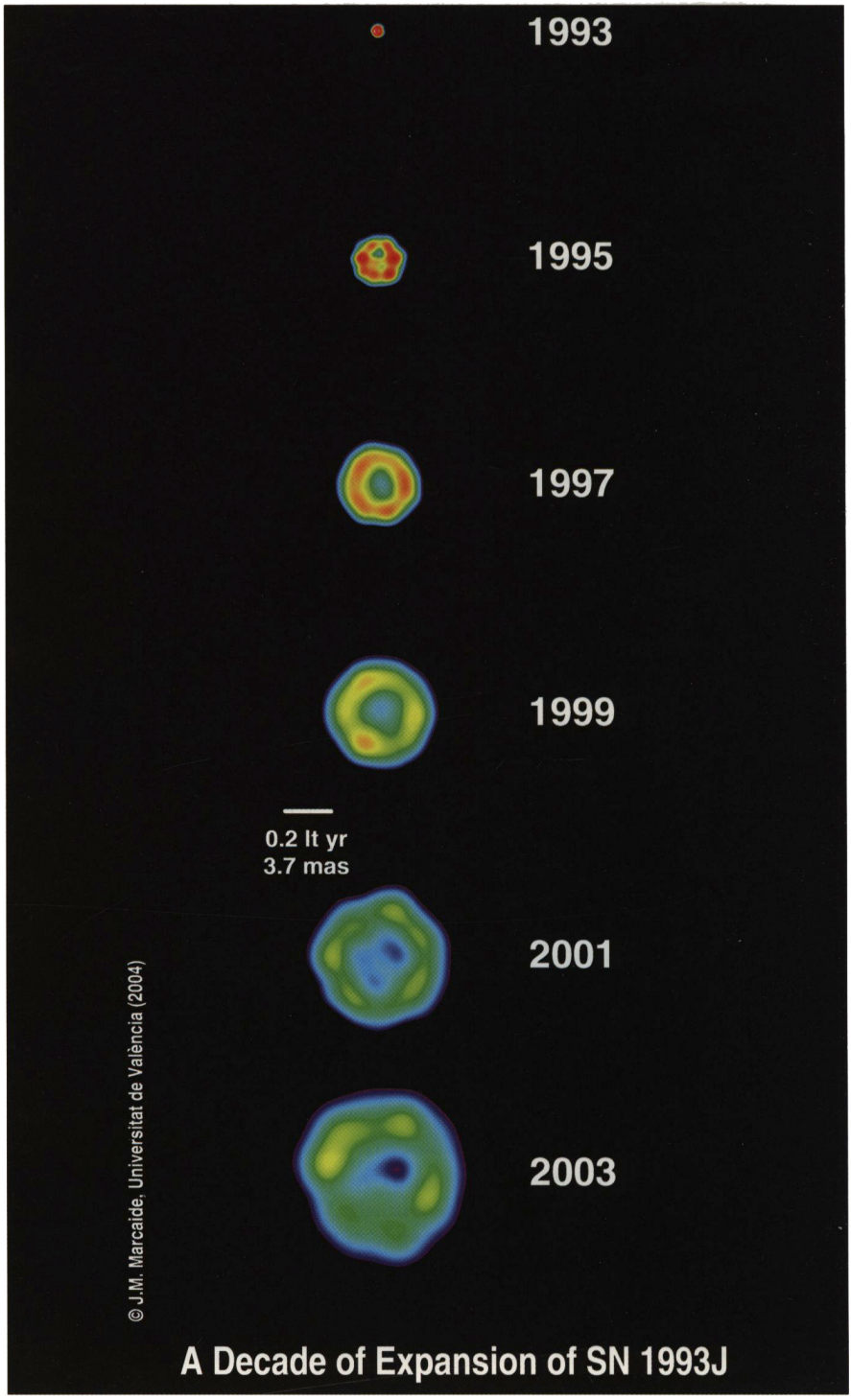

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Part VII Gamma-Ray Bursters

Part VIII Supernovae, Gamma-Ray Bursters, and Cosmology

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https://doi.org/10.1017/S0252921100008915 Published online by Cambridge University Press

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https://doi.org/10.1017/S0252921100008915 Published online by Cambridge University Press

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https://doi.org/10.1017/S0252921100008915 Published online by Cambridge University Press

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https://doi.org/10.1017/S0252921100008915 Published online by Cambridge University Press

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