

Lecture Notes in Physics

Edited by H. Araki, Kyoto, J. Ehlers, München, K. Hepp, Zürich
R. Kippenhahn, München, D. Ruelle, Bures-sur-Yvette
H.A. Weidenmüller, Heidelberg, J. Wess, Karlsruhe and J. Zittartz, Köln

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A. Cassatella R. Viotti (Eds.)

Physics of Classical Novae

Proceedings of Colloquium No. 122
of the International Astronomical Union
Madrid, Spain 1989



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Editors

A. Cassatella
IUE Observatory, ESA
E-28080 Madrid, Spain

R. Viotti
Istituto Astrofisica Spaziale, CNR
I-00044 Frascati, Italy

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PREFACE

In the last decade it has become possible to gain access to spectral regions practically unexplored previously, such as the infrared with IRAS, X-rays with the Einstein Observatory and with EXOSAT, and the ultraviolet with the International Ultraviolet Explorer (IUE). As far as the latter is concerned, the observation of novae with this small but immensely useful satellite has given, in eleven years of operation, such a large amount of new data that it was natural to organize this meeting close to one of the two IUE observatories.

Although several meetings have been devoted to cataclysmic variables in recent years, none has been specifically devoted to the most spectacular examples, the classical novae. The last conference on the subject was that on "Novae and Related Stars", which was organized in 1976 in Paris by the chairman of the present colloquium (MF). This also represents another ideal line of continuity with that previous Paris meeting. IAU Colloquium No. 122 was held from 27 to 30 June 1989 in the lecture hall of the Caja de Madrid, Madrid, Spain. The large attendance (99 participants from 19 countries), the large number of review and poster papers, and the lively discussions indicate the wide interest in the field. We were especially pleased by the presence of Professor Leonida Rosino, who is one of the pioneers in the study of galactic and extragalactic novae.

It is generally accepted that the outbursts of classical novae are powered by thermonuclear runaways taking place in the surface layers of the white dwarf component of a cataclysmic binary. The outburst appears to be triggered by accretion from its companion, which is usually close to the main sequence. However, many problems and controversies still exist, especially concerning the outburst properties. These include "elementary" issues such as the geometry and kinematics of the material which is ejected during an outburst and the relation of the outburst properties to the parameters of the systems. The physics of dust formation in nova envelopes and the role of magnetic fields are also uncertain. IAU Colloquium No. 122 was not intended to give a general overview of the classical novae, since good reviews on this topic already existed. As indicated by its name, the colloquium "Physics of Classical Novae" was organized with the aim of investigating the physical processes associated with the nova phenomenon, so it especially addressed the above-mentioned problems.

These proceedings contain the papers presented, as reviews or posters, during the colloquium. After the introductory talk by R.P. Kraft describing how the binary model was established there are three sessions of observations: the basic properties of novae, novae during outbursts, and nebular ejecta. The following sessions are devoted to models of observations, theory, and related objects. The highlights of the colloquium are summarized by P. Eggleton. In order to help the reader in finding any specific subject, there is a final index on the main subjects and stellar objects discussed in the book.

We are grateful to the other members of the scientific organizing committee for their assistance in the scientific organization of the Colloquium. We also thank those colleagues (P. Szkody, B.J.M. Hassall, J. Krautter, R. Tylanda, M. Orio, and J. Mikołajewska) who kindly gave reports on the posters, and all the participants for their active and often "vigorous" participation in the discussions. We extend our thanks to the other members of the local organizing committee for the careful organization of the colloquium. Many other persons have contributed with enthusiasm to the success of this colloquium. Among others we acknowledge Carmen Ramirez, Lidia Barbanera and Vicky Morales for their help in the organization and preparation of these proceedings. The meeting was sponsored by IAU Commission 29, and co-sponsored by IAU Commissions 35, 36, 42, and 44. We also acknowledge the support by the IUE Observatory of VILSPA, Madrid, the European Space Agency, the Planetario de Madrid, the Ayuntamiento de Madrid, the Spanish Ministerio de Educación y Ciencia, the Caja de Ahorros de Madrid, the Comunidad Autónoma de Madrid, and the Istituto di Astrofisica Spaziale of the Consiglio Nazionale delle Ricerche, Frascati.

Paris, Madrid, Frascati
October 1989

Michael Friedjung
Angelo Cassatella
Roberto Viotti

Scientific Organizing Committee

M. Friedjung (chairman)	J.W. Truran
A. Cassatella (co-chairman)	A.V. Tutukov
H.W. Duerbeck	R. Tylanda
A. Evans	R. Viotti
M. Kato	B. Warner
M. Livio	R.E. Williams
M.A.J. Snijders	

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C. Eiroa	R. González-Riestra
T. Fernández-Castro	C. Morales
A. Gimenez	A. Sánchez

CONTENTS

Welcome Address W. Wamsteker	1
Cataclysmic Variables as Binary Stars: Then and Now R.P. Kraft	3
1a - BASIC PROPERTIES OF NOVAE	
The Long Term Behaviour of Classical Old Novae A. Bianchini	13
Classical Novae: Properties between Outbursts B. Warner	24
Galactic Distribution and Outburst Frequency of Classical Novae H.W. Duerbeck	34
Novae in Clusters and Galaxies M. Shara	42
Strong Magnetic Fields in Nova Systems (Summary) H.S. Stockman and G.D. Schmidt	47
Posters	
Quasi-periodic Outburst Activity of Novae at Minimum M. Della Valle and M. Calvani	48
Spin Period Variations of the White Dwarf in FO Aqr/H2215-086 T. Augusteijn	50
The Galactic Nova Rate M. Della Valle and R. Claudi	53
A Possible Nova from the IRAS Point Source Catalogue P. Garcia-Lario, A. Manchado, K.C. Sahu, and S.R. Pottasch	55
Where is Nova 1437 ? Surprises in the Space Density of Cataclysmic Variables M.M. Shara, M. Potter, A.F.J. Moffat, M. Bode, and F.R. Stephenson	57
On the Postoutburst Far Ultraviolet Declines of WZ Sagittae and V1500 Cygni E.M. Sion and P. Szkody	59
Spectroscopic Observations of the Southern Old Novae CP Pup and V841 Oph A. Bianchini, M. Friedjung, and F. Sabbadin	61

CP Puppis: Another V1500 Cyg? D. O'Donoghue, B. Warner, W. Wargau, and A.D. Grauer	63
The UV Luminosity of Old Novae P.L. Selvelli, A. Cassatella, A. Bianchini, M. Friedjung, and R. Gilmozzi	65
V1500 Cyg: Slow Variability in Post-nova Stage E. Pavlenko	68
Maximum Magnitude vs. Rate of Decline for Novae of the LMC M. Capaccioli, M. Della Valle, M. D'Onofrio, and L. Rosino	71
On V603 Aql and Magnetic Novae A. Schwarzenberg-Czerny and A. Udalski	73
1b - NOVAE DURING OUTBURSTS	
Optical Studies of Classical Novae in Outburst W.C. Seitter	79
Chemistry of Nova Envelopes A.A. Boyarchuk and L.I. Antipova	97
Ultraviolet Observations of Classical Novae in Outburst A. Cassatella and R. Gonzalez-Riestra	115
Multi-wavelength Observations of Novae in Outburst S. Starrfield	127
New Infrared Results for Classical Novae R.D. Gehrz	138
Recent and Future X-Ray Observations of Classical Novae During the Outburst Stage H. Ögelman	148
Posters	
New Results About Post Optical Maximum Oscillations of Novae A. Bianchini, M. Friedjung, and W. Brinkmann	155
Simultaneous Optical and UV Spectra of the Two LMC Novae 1988 H. Drechsel, J. Andreae, S. Starrfield, and G. Sonneborn	157
Optical Spectrophotometry of Nova PW Vulpeculae J. Mikołajewska and M. Mikołajewski	159
The Early Outburst Spectra of Nova V1500 Cygni M. Mikołajewski and J. Mikołajewska	161

Mass of the Ejected Envelope of LV Vulpeculae D. Raikova	163
The Peculiar Slow Nova X`Serpentis H.W. Duerbeck and W.C. Seitter	165
1c - NEBULAR EJECTA	
Images and Light Curves of the Radio Remnants of Novae R.M. Hjellming	169
Optical Imagery of Nova Remnants R.A. Wade	179
Physical Properties and Abundances of Novae in the Nebular Phase M.A.J. Snijders	188
Posters	
An H α Image of Nova V1500 Cygni Twelve Years After Outburst R.A. Wade, R. Ciardullo, J.B. DeVeney, G.H. Jacoby, and W.E. Schoening	195
PAH's and Silicate Emission in Nova Cen 1986 C.H. Smith, D.K. Aitken, and P.F. Roche	197
Mm CO Observation of the Old Nova MQ Vul J.S. Albinson and A. Evans	199
Nova Ophiuchi 1988: 0.9-1.35 μ m Spectroscopy D.K. Lynch, R.J. Rudy, G.S. Rossano, P. Erwin, and R.C. Puetter	200
Measurements of Outburst Characteristics, Temperatures, Densities and Abundances in the Ejecta of Nova Muscae 1983 B.J.M. Hassall, M.A.J. Snijders, A.W. Harris, A. Cassatella, M. Dennefeld, M. Friedjung, M. Bode, D. Whittet, P. Whitelock, J. Menzies, T. Lloyd Evans, and G.T. Bath	202
Element Abundances of Nova PW Vulpeculae J. Andreae and H. Drechsel	204
Chemical Composition of Nova Centauri 1986 J.A. de Freitas Pacheco, R. Dell'Aglio, D. Costa, and S.J. Codina-Landaberry	206
Ultraviolet Spectroscopy of the Shell of RR Pic H.W. Duerbeck, W.C. Seitter, M.F. Bode, and A. Evans	208
Infrared Spectra of Recent Novae Y. Andrillat and L. Houziaux	210

2 - MODELS OF OBSERVATIONS

The Ionization of Novae Ejecta R.E. Williams	215
Winds from Disks J.E. Drew	228
Physics of Mass Ejection During Nova Outbursts M. Kato	236
Effects of the Presence of Supercritical Winds M. Friedjung	244
Formation and Evolution of Dust in Novae A. Evans	253
Model Atmospheres for Novae During the Early Stages R. Wehrse, P.H. Hauschildt, G. Shaviv, and S. Starrfield	264
The Continuum Spectra of Accretion Disks in Novalike Objects G. Shaviv and R. Wehrse	277
Posters	
Infrared Emission from Classical Novae J. MacDonald	290
Cool Envelopes of Post-Novae. Constraints on the Decline of the White Dwarf G. Stasinska and R. Tylenda	293
Chemical Routes to Dust Formation in Ejecta of Novae J.M.C. Rawlings and D.A. Williams	295
Modelling the Common Envelope Phase in Classical Novae A. Shankar, J.W. Truran, A. Burkert, and M. Livio	297
Tonization and Temperature Structure in Nova Shells H. Beck, H.-P. Gail, H. Gass, and E. Sedlmayr	299
Formation of the Balmer Line in the Optically Thick Nova Envelope Y. Takeda	301
HeI Emission Line Formation in Symbiotic Stars and Novae H.M. Schmid	303
Soft X-Ray Emission from Classical Novae in Outburst S. Starrfield, J.W. Truran, W.M. Sparks, J. Krautter, and J. MacDonald	306

3 - THEORY

Classical Novae in the Context of the Evolution of Cataclysmic Binaries H. Ritter	313
The Origin and Evolution of Novae A.V. Tutukov and L.R. Yungelson	325
Novae Between Outbursts M. Livio	342
The Cyclic Evolution of Classical Novae D. Prialnik	351
Thermonuclear Runaway Model W.M. Sparks, G.S. Kutter, S. Starrfield, and J.W. Truran	361
Theoretical Implications of Nova Abundances J.W. Truran	373
Posters	
The Theoretical Frequency of Classical Nova Outbursts as a Function of White Dwarf Mass M. Politano, M. Livio, J.W. Truran, and R.F. Webbink	386
Accretion on CO White Dwarfs. Influence of the External Burning Shells on the Evolution M. Hernanz, J. José, and J. Isern	388
Effective Growth Rate of White Dwarf Mass in Nova Outbursts M. Kato and I. Hachisu	390
The White Dwarf Mass and Orbital Period Distributions in Zero-Age Cataclysmic Variables M. Politano and R.F. Webbink	392
Diffusion in Novae at High Accretion Rates A. Kovetz and D. Prialnik	394
On the Nature of the Outflow from Nova Stars Occurring Immediately After Ejection of an Envelope V.G. Gorbatsky	397
Novae as Local Thermonuclear Runaways M. Orío and G. Shaviv	400

4 - RELATED OBJECTS

Recurrent Novae R.F. Webbink	405
The Symbiotic Novae R. Viotti	416

Posters

Spectroscopic Results of the Recurrent Nova R ϕ Ophiuchi G.C. Anupama and T.P. Prabhu	423
A Spectroscopic Survey of Recurrent Novae at Minimum H.W. Duerbeck and W.C. Seitter	425
Possible X-Ray Flares in a Recurrent Nova T. Hachisu and H. Itoh	427
The 1989 Outburst of V404 Cygni: A Very Unusual X-Ray Nova R.M. Wagner, S. Starrfield, A. Cassatella, R. Gonzalez-Riestra, T.J. Kreidl, S.B. Howell, R.M. Hjellming, X.-H. Han, C. Shrader, G. Sonneborn, G.W. Collins, R. Bertram, M.W. Buie, H.E. Bond, J. Johnson, T. Harrison, R.D. Gehrz, F.A. Córdova, P. Szkody, B. Margon, J. MacDonald, R. Fried	429
The Structure of the Envelopes of Symbiotic Novae G.B. Baratta, A. Damini Neto, C. Rossi, and R. Viotti	431
HM Sge Still Evolving H. Nussbaumer and M. Vogel	433
IR Observations of the Symbiotic Nova HM Sagittae O.G. Taranova and B.F. Yudin	435
The Light Curve of the Symbiotic Nova HM Sagittae V.P. Arkhipova, T.S. Belyakina, O.D. Dukuchaeva, and R.I. Noskova	437
The Nova-Type Outburst of the Symbiotic Star AS 296 U. Munari	440
Co-ordinated Optical and Radio Observations of Symbiotic Stars R.J. Ivison, M.F. Bode, J. Meaburn, R.J. Davis, R.F. Nelson, R.E. Spencer	442
High Resolution Spectroscopy of Symbiotic Stars H.E. Schwarz, H.W. Duerbeck, and W.C. Seitter	444
CONFERENCE SUMMARY	
Some Comments on Classical Novae and Related Systems P.P. Eggleton	449
Author index	455
Object index	457

LIST OF PARTICIPANTS

Andreae, J.	Dr. Remeis Observatory	Bamberg, Germany
Andrillat, Y.	Laboratoire d'Astronomie	Montpellier, France
Antipova, L.I.	Astronomical Council	Moscow, USSR
Anupama, G.C.	Indian Institute of Astrophysics	Bangalore, India
Armentia, J.E.	Universidad Complutense	Madrid, Spain
Augustejn, T.	European Southern Observatory	La Silla, Chile
Baratta, G.B.	Osservatorio Astronomico	Roma, Italy
Barden, S.	National Optical Astronomy Observ.	Tucson, USA
Barrera, L.H.	European Southern Observatory	La Silla, Chile
Bianchini, A.	Osservatorio Astronomico	Padova, Italy
Boyarchuk, A.A.	Astronomical Council	Moscow, USSR
Cassatella, A.	IUE Observatory	Madrid, Spain
Claret dos Santos, A.	Instituto Astrofisica de Andalucia	Granada, Spain
Claudi, R.	Osservatorio Astronomico	Padova, Italy
Damineli Neto, A.	Istituto Astrofisica Spaziale (CNR)	Frascati, Italy
D'Antona, F.	Osservatorio Astronomico	Roma, Italy
de Freitas Pacheco, J.A.	Instituto Astronomico e Geofisico	Sao Paulo, Brasil
Della Valle, M.	Osservatorio Astronomico	Padova, Italy
D'Onofrio, M.	Internat. School Advanced Studies	Trieste, Italy
Drechsel, H.	Dr. Remeis Observatory	Bamberg, Germany
Drew, J.E.	Department of Astrophysics	Oxford, UK
Duerbeck, H.W.	Astronomisches Institut	Muenster, Germany
Eggleton, P.P.	Institute of Astronomy	Cambridge, UK
Eiroa, C.	Observatorio Astronomico Nacional	Madrid, Spain
Ensman, E.	Lick Observatory	Santa Cruz, USA
Evans, A.	University of Keele	Keele, UK
Fernandez-Castro, T.	Planetario de Madrid	Madrid, Spain
Fernandez-Perez, A.	Instituto Astrofisica de Canarias	Tenerife, Spain
Friedjung, M.	Institut d'Astrophysique (CNRS)	Paris, France
Garcia-Lario, P.	Instituto Astrofisica de Canarias	Tenerife, Spain
Gass, H.	Institut f. Astron. und Astrophysik	Berlin, Germany
Gehrz, R.D.	University of Minnesota	Minneapolis, USA
Gimenez, A.	Instituto Astrofisica de Andalucia	Granada, Spain
Giovannelli, F.	Istituto Astrofisica Spaziale (CNR)	Frascati, Italy
Gonzalez-Riestra, R.	IUE Observatory	Madrid, Spain
Hachisu, I.	University of Kyoto	Kyoto, Japan
Hassall, B.J.M.	Royal Greenwich Observatory	Cambridge, UK
Hernanz, M.	Universidad Politecnica de Cataluna	Barcelona, Spain
Hjellming, R.M.	National Optical Astronomy Observ.	Socorro, USA
Houziaux, L.	Université de Mons	Mons, Belgium
Iijima, T.	Osservatorio Astrofisico	Asiago, Italy
Iverson, R.J.	Lancashire Polytechnic	Preston, UK
Kato, M.	Keyo University	Yokohama, Japan
Kovetz, A.	University of Tel Aviv	Tel Aviv, Israel
Kraf, R.P.	Lick Observatory	Santa Cruz, USA
Krautter, J.	Landessternwarte	Heidelberg, Germany
Livio, M.	Technion	Haifa, Israel
Lynch, D.	The Aerospace Corporation	Los Angeles, USA
MacDonald, J.	University of Delaware	Newark, USA

Manchado, P.	Instituto Astrofisica de Canarias	Tenerife, Spain
Mikolajewska, J.	Institute of Astronomy	Torun, Poland
Moffat, A.F.J.	University of Montreal	Montreal, Canada
Monier, R.	IUE Observatory	Madrid, Spain
Morales, C.	I.N.T.A.	Madrid, Spain
Munari, U.	Osservatorio Astrofisico	Asiago, Italy
Naylor, T.	Institute of Astronomy	Cambridge, UK
Netzer, H.	University of Tel Aviv	Tel Aviv, Israel
Nofar, I.	Technion	Haifa, Israel
O'Donoghue, D.	University of Cape Town	Cape Town, South Africa
Ogelman, H.	Max Plank Inst. fur Extr. Physik	Garching, Germany
Orio, M.	Max Plank Inst. fur Astrophysik	Garching, Germany
Politano, M.	Arizona State University	Tempe, USA
Prialnik, D.	University of Tel Aviv	Tel Aviv, Israel
Raikova, D.	Bulgarian Academy of Sciences	Sofia, Bulgaria
Rawlings, J.M.C.	U.M.I.S.T.	Manchester, UK
Ritter, H.	Universitats-Sternwarte Munchen	Munchen, Germany
Rosa, F.	Instituto Astrofisica de Canarias	Tenerife, Spain
Rosino, L.	Università di Padova	Padova, Italy
Sanchez, A.	Planetario de Madrid	Madrid, Spain
Saul, D.	Lancashire Polytechnic	Preston, UK
Schmid, H.M.	Institute of Astronomy (ETH)	Zurich, Switzerland
Schwarz, H.E.	European Southern Observatory	La Silla, Chile
Schwarzenberg-Czerny, A.	Warsaw University Observatory	Warsaw, Poland
Seitter, W.C.	Astronomisches Institut	Muenster, Germany
Selvelli, P.L.	Osservatorio Astronomico	Trieste, Italy
Shankar, A.	University of Illinois	Urbana, USA
Shara, M.M.	Space Telescope Science Institute	Baltimore, USA
Shaviv, G.	Israel Institute of Technology	Haifa, Israel
Sion, E.M.	Villanova University	Villanova, USA
Smith, C.	New South Wales University	Campbell, Australia
Sparks, W.	Los Alamos National Laboratory	Los Alamos, USA
Starrfield, S.	Arizona State University	Tempe, USA
Stasinska, G.	Observatoire de Meudon	Meudon, France
Stockman, H.S.	Space Telescope Science Institute	Baltimore, USA
Szkody, P.	University of Washington	Seattle, USA
Takeda, Y.	Institut fur Theoretische Astrophysik	Heidelberg, Germany
Truran, J.W.	University of Illinois	Urbana, USA
Tutukov, A.	Astronomical Council	Moscow, USSR
Tylenda, R.	Copernicus Astronomical Center	Torun, Poland
Vidal, N.V.	Institute for Sciences and Technology	Givat Shmuel, Israel
Viotti, R.	Istituto Astrofisica Spaziale (CNR)	Frascati, Italy
Wade, R.A.	Steward Observatory	Tucson, USA
Warner, B.	University of Cape Town	Cape Town, South Africa
Webbink, R.F.	University of Illinois	Urbana, USA
Wehrse, R.	Institut f. Theoretisches Astrophysik	Heidelberg, Germany
Williams, R.E.	Cerro Tololo Inter-American Observ.	La Serena, Chile
Woods, J.A.	University of Oxford	Oxford, UK
Yudin, B.F.	Sternberg State Astronomical Inst.	Moscow, USSR
Yungelson, L.R.	Astronomical Council	Moscow, USSR