Lecture Notes in Physics

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Physics of Classical Novae

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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. Tylenda, 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 aknowledge 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

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