Although spectroscopy is available for several SNe Ia around maximum light, we still entirely lack bolometric luminosities and regular spectral observations beyond 150 days. It is not clear, in fact, how wide among various objects are the differences suggested both by spectra (Branch et al. 1988) and by light curves (Barbon 1980) and how they correlate with other parameters. This could be a problem for the frequent use of such objects as standard candles unless such differences can be accounted for and calibrated in a systematic way. For the less luminous and rarer Type Ib SNe, the observational status is at present even worse. Few objects have optical light curves, and bolometric information is completely lacking. Even the early spectral evolution is poorly known (because of sparse observations). Because the conditions in the envelope have not been clarified, since neither a spectroscopic temperature nor a thermal equilibrium calculation have been derived, the actual mass of oxygen has not been determined to within a factor of 10, preventing an accurate determination of the mass range of possible progenitors and their contribution to the chemical evolution of galaxies.

The heterogeneous class of Type II SNe represent another interesting field of investigation. In particular, we will try to understand if different shapes exist also in the bolometric light curves and to determine their total energy budget, which will lead to the determination of the total mass of radioactive ^{56}Co produced. Regularly spaced spectra of a number of objects will clarify whether all the documented differences are real or due only to the uneven spacing of the available information. If this variety represents differences in the envelopes of these SNe, it is not clear how this relates to the characteristics of the progenitor stars.

Beside the regularly spaced observations of newly discovered SNe, a special effort will be devoted to the identification and eventual observation of "very old" supernovae. There exists, in fact, an observational gap between the latest stages of SNe, which can be placed at about 2 years after the light maximum, and the youngest SNRs, whose ages are of the order of a few centuries. The optical detection of SN 1957D in M83 (Turatto et al., 1989; Long et al., 1989) and of SN 1885A in M31 (Fesen et al., 1989) indicates that it is possible to get precious information on the intermediate ages even with the presently available instrumentation. In particular, the spectrum of the 30-year-old SN 1957D in M83 shows broad [OIII] 4959, 5007 lines with asymmetric profiles and a velocity of the maximum emission of approximately −650 km/s relative to the rest velocity. This could be due to the presence of dust filling the line-forming region analogous to the situation found in SN 1987A. For this SN, unfortunately, early-stage observations are missing and an unambiguous classification is then impossible. However, there are about 70 SNe older than 10 years accessible from La Silla, which are candidates for detection. Although many difficulties arise when one tries to locate the very faint candidates inside the parent galaxy, even a small number of successes would constitute milestones in the understanding of the evolution of young SNR.

The collaboration with CTIO, with whom important coordinated observations have been obtained on SN 1987A, and with the Asiago Observatory, for the early stages of the SNe visible also from the northern hemisphere, should also ensure both a better temporal and spectral coverage.

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PROFILE OF A KEY PROGRAMME

Optical Follow-up Identifications of Hard X-Ray/ Soft γ-Ray Sources Discovered by the "SIGMA" Telescope

G.F. BIGNAMI, P.A. CARAVEO, S. MEREGHETTI, Istituto Fisica Cosmica, Milano, Italy

J. PAUL, A. GOLDWURM, L. VIGROUX, Service d'Astrophysique, CEA Saclay, France

P. MANDROU, G. VEDRENNE, J.P. ROQUES, CERS, Toulouse, France

The aim of this programme is to search for the optical counterparts of hard X-ray/soft γ-ray sources (including γ-ray bursts and transient events) discovered by the SIGMA telescope (successfully launched on December 1, 1989), also exploiting the soft X-ray data of the all sky survey to be performed by the ROSAT satellite (launched on May 31, 1990).

It will be the first time that coordination between on-going high-energy space missions, such as SIGMA and ROSAT, and ground-based telescopes is implemented on a programmed long-term basis.

The SIGMA telescope (constructed by two French groups at CEA/Saclay and CESR Toulouse) aboard the Soviet GRANAT satellite represents the first breakthrough in one of the last unexplored wavelength regions in astronomy. Launched on December 1, 1989, it consists of a gamma camera/coded mask telescope system (see Fig. 1) separated by 2.5 m, with imaging capability yielding a source localization accuracy of 2′ within a field of view of $4\overset{\circ}{.}3 \times 4\overset{\circ}{.}7$ and a sensitivity in the milliCrab region. The energy range goes from 35 keV to 1.3 MeV, and operations, planned for two years, will be based on 10^5–10^6 sec. pointed observations of the 3-axis stabilized telescope.

After the mandatory outgassing period of the various SIGMA subsystems, more than two months of in-flight operations were required both to complete the telescope adjustment (a quite difficult task, taking into account the 131 photomultiplier tubes of the gamma camera, the on-board calibration sources and the active shielding device), and to evaluate the background along the orbit. This is now stabilized on a rather constant value of 440 counts/sec, which compares favourably with the one computed on the ground of 320 counts/sec,

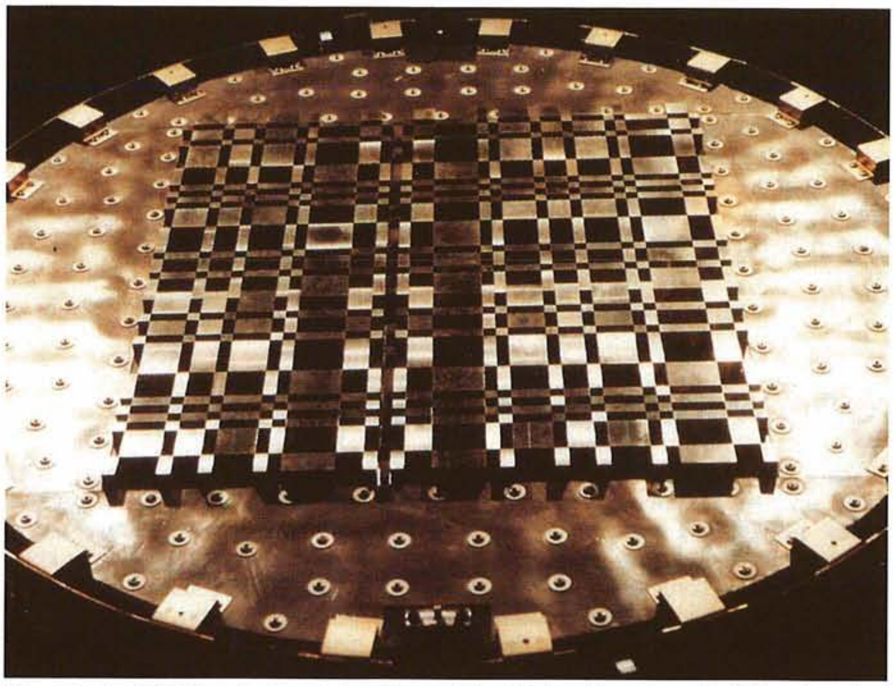

Figure 1: *The SIGMA coded mask. A pattern of 49 × 53 absorbing elements (1.5 cm tungsten) is arranged in a URA (Uniformly Redundant Array), each element is 9.4 × 9.4 mm.*

considering the current high level of solar activity. At the end of this evaluation period, several Crab nebula observations were performed to assess the in-orbit capabilities of the telescope. Both this source and Cyg-X1 yielded a very strong signal permitting the preliminary localization of the position of these sources within a 2′ error box in a 4-h observation, with very high significance up to 300 KeV and more.

A different type of test was performed on the Galactic Centre, with the aim of disentangling a supposedly complex region of high energy emission. SIGMA has already provided the *first ever* arcmin resolution image of the galactic centre in the 35–120 keV region. While work is in progress to analyse in more detail the data which were taken on March 24, 1990, we are already in a position to say that at such high energy the region is dominated by emission from 1E 1740.7–2942, an unidentified Einstein source.

The SIGMA observations will yield results both on known X-ray sources, extending our knowledge of their spectrum, and on a wealth of new sources, galactic and extragalactic.

On the basis of what is currently known of the high energy emission from AGN's and their Log N-Log S, it is possible to predict the final yield of the SIGMA mission as several tens of new AGN's seen in the hundred of keV energy range.

In addition, the mission will study a great number of γ-ray bursts occurring during its operating lifetime, and few of them have already been observed. Thanks to the dimension of the fully coded field of view, several bursts will be observed through the imaging coded mask system, thus yielding, *for the first time,* an immediate localization with an accuracy of a few arcminutes and allowing a rapid coordination with ground-based optical observations. It is worth noting that the rectangular telescope field of view features a central area, in which the telescope is at its maximum, surrounded by a wide field of decreasing sensitivity (the half-sensitivity boundary is a $10\overset{\circ}{.}6 \times 11\overset{\circ}{.}4$ rectangle) within which sources can still be positioned within a few arcminutes.

In parallel to the SIGMA higher energy observations, the well-known ROSAT mission will work in the soft (.1–2 keV) X-ray domain, performing first a sky survey and then a sequence of pointed observations. The proposers of this ESO Key Programme have organized a collaboration between the two missions for exploiting the ROSAT survey data on the basis of the SIGMA results. This should result in an improvement of both source positioning and knowledge of spectral shape, rendering much more interesting and meaningful the search for the optical counterpart. Based on the proposer's experience in optical studies of γ/X-ray sources, the addition of the ROSAT data will be crucial to the success of this project especially for the search for an optical identification of newly discovered sources which is the most challenging, albeit the potentially most rewarding, part of the programme. The strategy here will consist in taking first CCD images of the source region in two colours, compare the images with

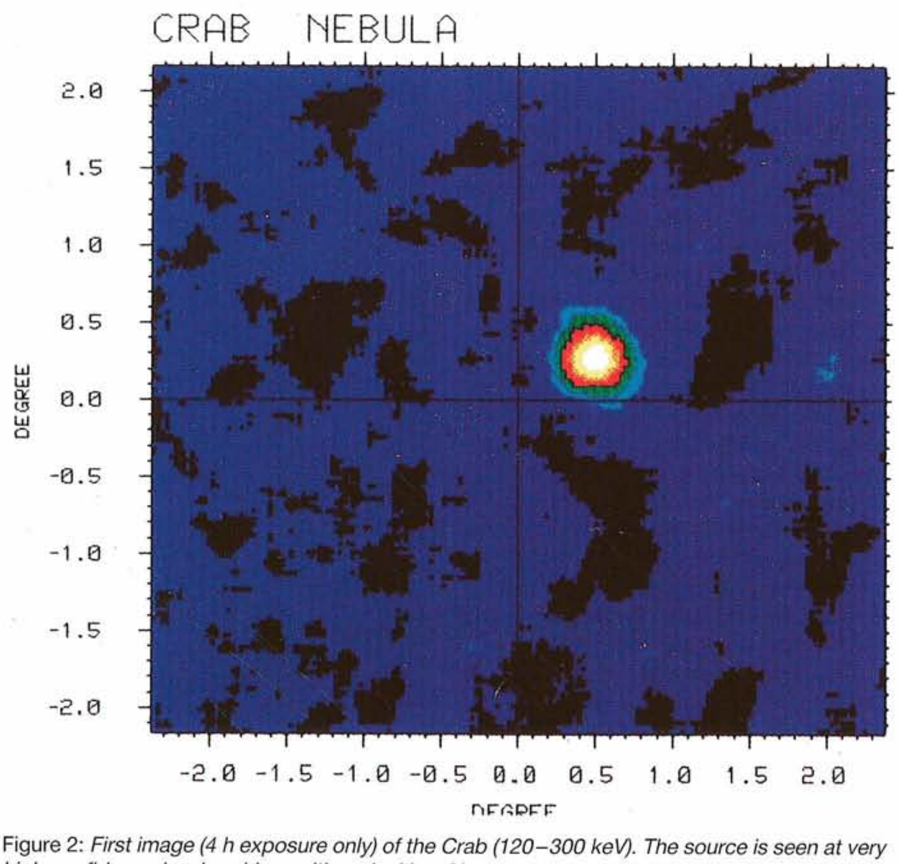

Figure 2: *First image (4 h exposure only) of the Crab (120–300 keV). The source is seen at very high confidence level and is positioned with a 2′ accuracy.*

all existing catalogues, hopefully find potential candidates and then resort to MOS spectra. Another useful dimension for identification is time variability on both long and short term timescales, as in the case of AGNs and X/γ-ray pulsars in our Galaxy. Polarimetry, also possible e.g. with EFOSC, on a complete source field, is yet another tool for identifying a high-energy, nonthermal candidate among normal field stars. This type of work has already been the subject of several programmes approved during the last four years for the ESO 3.6-m and NTT telescopes at La Silla. This has resulted in the successful study of several X/γ-ray source regions, carried out both in imaging/photometry, spectroscopy (including MOS), polarimetry and time variability.

We are confident that this Key-Programme team has both the observational experience and the organizational capability to fulfil the proposed scientific objectives for the first example of a ground based/high-energy space astronomy programme.

Report on the First ESO/CTIO Workshop: "Bulges of Galaxies"

The first ESO/CTIO Workshop was held on January 16–19, 1990, in La Serena, Chile. The scientific sessions took up 3 days with 2 afternoons reserved for visits to the La Silla and Tololo observatories. The theme of the workshop was "Bulges of Galaxies" and included all aspects of bulge research, both Galactic and in external galaxies.

There were eleven invited and about thirty shorter, contributed papers. A poster session was also provided. The meeting was attended by about 90 scientists from 5 continents. About 30, mainly young participants, were partially supported by the conference funds allowing them to attend and to present contributions.

The proceedings are being edited and will be published later this year by ESO.

It was a pleasure to work together with our colleagues from CTIO and it was good to hear many positive comments from the participants.

I hope that there will be many more such joint meetings held in Chile and that they may all be as stimulating as this one.

H. E. SCHWARZ, ESO

News About the ESO Exhibition

The travelling ESO Exhibition has a busy time this summer. Last year it was decided to duplicate most of the exhibition items, so that it can be shown in two places at once. This has paid off and both exhibitions are now booked out through most of 1991.

ESO was present, together with its sister organizations CERN, ESA and EMBL, at the "Europa Ricerca" exhibition in Rome, Italy on May 31–June 10. This major presentation of large European science and technology projects was organized by the Italian Chairmanship of Eureka in connection with the VIII Eureka Minister Conference.

It you visit Geneva in Switzerland this summer, don't miss a tour through the new CERN Microcosmos, just installed on the CERN grounds near Meyrin, outside the city. In addition to learning about the smallest particles, you will see beautiful pictures of galaxies and stars in one area of the Microcosmos building. Here the ESO Exhibition is installed until the end of August. It was inaugurated on May 28 by the Directors General of CERN and ESO, Professors Carlo Rubbia and Harry van der Laan.

The "Free University" of Brussels in Belgium will be host to the American Association of Variable Star Observers (AAVSO) this summer. This is the first time that this venerable American organization meets outside its home country, let on another continent. In recognition of this important event, ESO is setting up its exhibition at the University from July 17 to 29. There will be public access; more details can be obtained from the organizer, Dr. Chris Sterken, Free University of Brussels, Astrophysical Institute, Pleinlaan 2, B-1180 Brussels, Belgium.

ESO was pleased to accept an invita-

From the opening ceremony of the Eureka Minister Conference and the exhibition Europa Ricerca – (left to right) the Italian Minister for Universities and Technological Research, A. Ruberti, CEC Vice-President F.M. Pandolfi, ESA Director General R. Lüst and ESO Director General H. van der Laan. Participating in the ceremony were the Italian President, Francesco Cossiga, ministers and high representatives from the Eureka member countries and the EEC, directors general from CERN, EMBL, ESA and ESO as well as delegates to the conference.