Catalogue of the 1997 SOHO–EIT coronal transient waves and associated type II radio burst spectra

A. Klassen, H. Aurass, G. Mann and B.J. Thompson

We compare the coronal transient wave phenomenon discovered by SOHO extreme ultraviolet observations (“EIT waves”) with the associated radio signature of a coronal shock wave (type II burst). 90% of the type II bursts are associated with an EIT wave. On average, the speed derived from the radio burst is about three times larger than the EIT wave speed. Within the sample, there is no correlation between the speeds of both tracers of a coronal disturbance. Under very general assumptions we conclude that both wave phenomena can be different signatures of the same fast magnetosonic disturbance.


Evolutionary tracks and isochrones for low- and intermediate-mass stars: From 0.15 to 7 $M_{\odot}$, and from $Z = 0.0004$ to 0.03

L. Girardi, A. Bressan, G. Bertelli and C. Chiosi

We present a large grid of stellar evolutionary tracks, which are suitable to modelling star clusters and galaxies by means of population synthesis. The tracks are presented for the initial chemical compositions $[Z = 0.0004, Y = 0.23]$, $[Z = 0.001, Y = 0.23]$, $[Z = 0.004, Y = 0.24]$, $[Z = 0.008, Y = 0.25]$, $[Z = 0.019, Y = 0.273]$ (solar composition), and $[Z = 0.03, Y = 0.30]$. They are computed with updated opacities and equation of state, and a moderate amount of convective overshoot. The range of initial masses goes from 0.15 $M_{\odot}$ to 7 $M_{\odot}$, and the evolutionary phases extend from the zero age main sequence (ZAMS) till either the thermally pulsing AGB regime or carbon ignition. We also present an additional set of models with solar composition, computed using the classical Schwarzschild criterion for convective boundaries. From all these tracks, we derive the theoretical isochrones in the Johnson-Cousins $UBVRIJHK$ broad-band photometric system.


A neutral hydrogen survey of polar ring galaxies. III. Nançay observations and comparison with published data

W. van Driel, M. Arnaboldi, F. Combes and L.S. Sparke

A total of 50 optically selected polar ring galaxies, polar ring galaxy candidates and related objects were observed in the 21-cm $H_1$ line with the Nançay decimetric radio telescope and 31 were detected. The objects, selected by their optical morphology, are all north of declination $-39^\circ$, and generally relatively nearby ($V < 8000$ km s$^{-1}$) and/or bright ($m_B < 15.5$). The $H_1$ line data are presented for all 74 galaxies observed for the survey with the Effelsberg, Green Bank or Nançay radio telescopes, as well as all other published $H_1$ line parameters of these objects. Three objects were observed and detected by us at Parkes. A total of 59 objects were detected. For each object a brief description is given based on a literature search.


Optical photometry of the UCM Lists I and II. I. The data

P.G. Pérez-González, J. Zamorano, J. Gallego and A. Gil de Paz

We present Johnson $B$ CCD photometry for the whole sample of galaxies of the Universidad Complutense de Madrid (UCM) Survey Lists I and II. They constitute a well-defined and complete sample of galaxies in the Local Universe with active star formation. The data refer to 191 S0 to Irr galaxies at an averaged redshift of 0.027, and complement the already published Gunn $r$, $J$ and $K$ photometries. In this paper the observational and reduction features are discussed in detail, and the new colour information is combined to search for clues on the properties of the galaxies, mainly by comparing our sample with other surveys.

The U.S. Naval Observatory pole-to-pole catalog: W2

T.J. Rafferty and E.R. Holdenried

Between the years 1985 and 1996 the U.S. Naval Observatory (USNO), using two transit circles, one located in Washington, DC (U.S.A.) and the other in Blenheim, New Zealand, conducted an ambitious program of absolute observations of positions of celestial objects completely covering both hemispheres. Over 737,000 individual observations were made, primarily of the International Reference Stars (IRS) and FK5 stars, as well as all the major planets (except Pluto) and thirteen minor planets. This included some 55,000 observations of day-time objects including the Sun, Mercury, Venus, and Mars.

The original objective was to form a traditional, all-sky catalog of absolute star positions which could be firmly linked to the dynamical system. However, with the success of the Hipparcos project and the adoption of the ICRF as the celestial reference frame, the primary focus of the pole-to-pole program changed. The stellar positions have been differentially reduced to the system of Hipparcos and these were used to tie the planetary observations into the ICRF. Thus the program has resulted in a body of high quality observational data (average standard deviation of a mean position of about 75 mas) that will provide important input for the production of ICRF-based ephemerides. This is particularly true for the outer and minor planets.


Mutual positions of the Galilean satellites of Jupiter from photometric observations during their mutual occultations and eclipses in 1997


We report the final results of the 1997 campaign of photometric observations of the mutual phenomena of the Galilean satellites carried out at observatories in Kazakhstan, Russia, and Ukraine. Our results contribute substantially to the world data bank of such observations and will allow the model of the motion of Galilean satellites to be further refined. To facilitate the use of photometric data, we reduced them by computing the planetocentric rectangular coordinate differences of satellite pairs for a number of instants of time so we deduce the differences for one instant from one observed light curve. It is these reduced data that constitute the principal result of this work. We based our data reduction on the method which we developed in earlier papers (Emel’yanov 1999; Emel’yanov 2000). The accuracy of observations was estimated in the process of reduction. The paper also describes the equipment used.


Spatially resolved spectroscopy of Coma cluster early–type galaxies. I. The database

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We present long slit spectra for a magnitude limited sample of 35 E and S0 galaxies of the Coma cluster. The high quality of the data allowed us to derive spatially resolved spectra for a substantial sample of Coma galaxies for the first time. From these spectra we obtained rotation curves, the velocity dispersion profiles and the $H_3$ and $H_4$ coefficients of the Hermite decomposition of the line of sight velocity distribution. Moreover, we derive the radial line index profiles of Mg, Fe and $\mathrm{H\beta}$ line indices out to $R \approx 1r_e - 3r_e$ with high signal-to-noise ratio. We describe the galaxy sample, the observations and data reduction, and present the spectroscopic database. Ground-based photometry for a subsample of 8 galaxies is also presented. The Coma cluster is one of the richest known clusters of galaxies, spanning about 4 decades in density. Hence it is the ideal place to study the structure of galaxies as a function of environmental density in order to constrain the theories of galaxy formation and evolution. Based on the spectroscopic database presented, we will discuss these issues in a series of future papers.


HI observations of nearby galaxies. I. The first list of the Karachentsev catalog

W.K. Huchtmeier, I.D. Karachentsev, V.E. Karachentseva and M. Ehle

We present HI observations of the galaxies in the first list of the Karachentsev catalog of previously unknown nearby dwarf galaxies (Karachentseva & Karachentsev 1998). This survey covers all known nearby galaxy groups within the Local Volume (i.e. within 10 Mpc) and their environment, that is about 25% of the total sky. A total of 257 galaxies have been observed with a detection rate of 60%. We searched a frequency band corresponding to heliocentric radial velocities from $-470$ km s$^{-1}$ to $\sim +4000$ km s$^{-1}$. Non-detections are either due to limited coverage in radial velocity, confusion with Local HI (mainly in the velocity range $-140$ km s$^{-1}$ to $+20$ km s$^{-1}$), or lack of sensitivity for very weak emission. 25% of the detected galaxies are located within the Local Volume. Those galaxies are dwarf galaxies judged by their optical linear diameter ($1.4 \pm 0.2$ kpc on the average), their mean total HI mass ($4.6 \times 10^7 M_\odot$), and their observed linewidths ($39$ km s$^{-1}$).

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Chemical composition of 90 F and G disk dwarfs


High resolution, high S/N spectra have been obtained for a sample of 90 F and G main-sequence disk stars covering the metallicity range $-1.0 < [\text{Fe/H}] < +0.1$, and have been analysed in a parallel way to the work of Edvardsson et al. (1993a) in order to re-inspect their results and to reveal new information on the chemical evolution of the Galactic disk. Compared to Edvardsson et al. the present study includes several improvements. Effective temperatures are based on the Alonso et al. (1996) calibration of color indices by the infrared flux method and surface gravities are calculated from Hipparcos parallaxes, which also allow more accurate ages to be calculated from a comparison of $M_V$ and $T_{\text{eff}}$ with isochrones. In addition, more reliable kinematical parameters are derived from Hipparcos distances and proper motions in combination with accurate radial velocities. Finally, a larger spectral coverage, 5600 – 8800 Å, makes it possible to improve the abundance accuracy by studying more lines and to discuss several elements not included in the work of Edvardsson et al.

The present paper provides the data and discusses some general results of the abundance survey. A group of stars in the metallicity range of $-1.0 < [\text{Fe/H}] < -0.6$ having a small mean Galactocentric distance in the stellar orbits, $R_m < 7$ kpc, are shown to be older than the other disk stars and probably belong to the thick disk. Excluding these stars, a slight decreasing trend of $[\text{Fe/H}]$ with increasing $R_m$ and age is found, but a large scatter in $[\text{Fe/H}]$ (up to 0.5 dex) is present at a given age and $R_m$. Abundance ratios with respect to Fe show, on the other hand, no significant scatter at a given $[\text{Fe/H}]$. The derived trends of O, Mg, Si, Ca, Ti, Ni and Ba as a function of $[\text{Fe/H}]$ agree rather well with those of Edvardsson et al., but the overabundance of Na and Al for metal-poor stars found in their work is not confirmed. Furthermore, the Galactic evolution of elements not included in Edvardsson et al., K, V and Cr, is studied. It is concluded that the terms “$\alpha$ elements” and “iron-peak elements” cannot be used to indicate production and evolution by specific nucleosynthesis processes; each element seems to have a unique enrichment history.


The ROSAT point spread functions and associates

F.G. Boese

The ROSAT point spread functions for the instruments XRT-PSPC, XRT-HRI, (XUV telescope)-WFC in pointing mode as well as the ROSAT survey point spread functions are documented. A series of plots exhibits the point spread function models. Commands dedicated and calibration tables related to point spread functions are explained. The internet addresses for the accompanying documentation are given.


Calibration and first light of the Diabolo photometer at the Millimetre and Infrared Testa Grigia Observatory


We have designed and built a large–throughput dual channel photometer, Diabolo. This photometer is dedicated to the observation of millimetre continuum diffuse sources, and in particular, of the Sunyaev–Zel’dovich effect and of anisotropies of the 3 K background. We describe the optical layout and filtering system of the instrument, which uses two bolometric detectors for simultaneous observations in two frequency channels at 1.2 and 2.1 mm. The bolometers are cooled to a working temperature of 0.1 K provided by a compact dilution cryostat. The photometric and angular responses of the instrument are measured in the laboratory. First astronomical light was detected in March 1995 at the focus of the new Millimetre and Infrared Testa Grigia Observatory (MITO) Telescope. The established sensitivity of the system is of $7\,mK, s^{1/2}$. For a typical map of at least 10 beams, with one hour of integration per beam, one can achieve the rms values of $y_{SZ} \simeq 7\,10^{-5}$ and the 3 K background anisotropy $\Delta L / L \simeq 7\,10^{-5}$, in winter conditions. We also report on a novel bolometer AC readout circuit which allows for the first time total power measurements on the sky. This technique alleviates (but does not forbid) the use of chopping with a secondary mirror. This technique and the dilution fridge concept will be used in future scan–modulated space instrument like the ESA PLANCK mission project.


Transient correction of the LW-ISOCAM data for low contrasted illumination

A. Coulais and A. Abergel

The detector of the Long Wavelength channel of the ISOCAM camera on-board the Infrared Space Observatory (ISO) presents systematic memory effects of the response which can bias the photometry by a factor as high as 40%. We show that, for uniform illumination, the non linear model developed by Fouks and Schubert (1995) for the detector of PHT-S channel of the ISOPHOT instrument allows us to describe the LW-ISOCAM response to upward and downward steps of flux with an accuracy better than 1%. For each pixel of the detector, only two parameters have to be used. These parameters are constant over
the whole life of ISO. On the other hand, spatial variations from pixel to pixel are significant. We present an inversion method of the Fouks-Schubert model. Without any fitting and for low contrasted illumination, data are corrected with a photometric accuracy of $\sim 1\%$, which is typically ten times better than previous methods. We suggest that the same approach could be used for others ISO detectors, and in the future for other experiments.