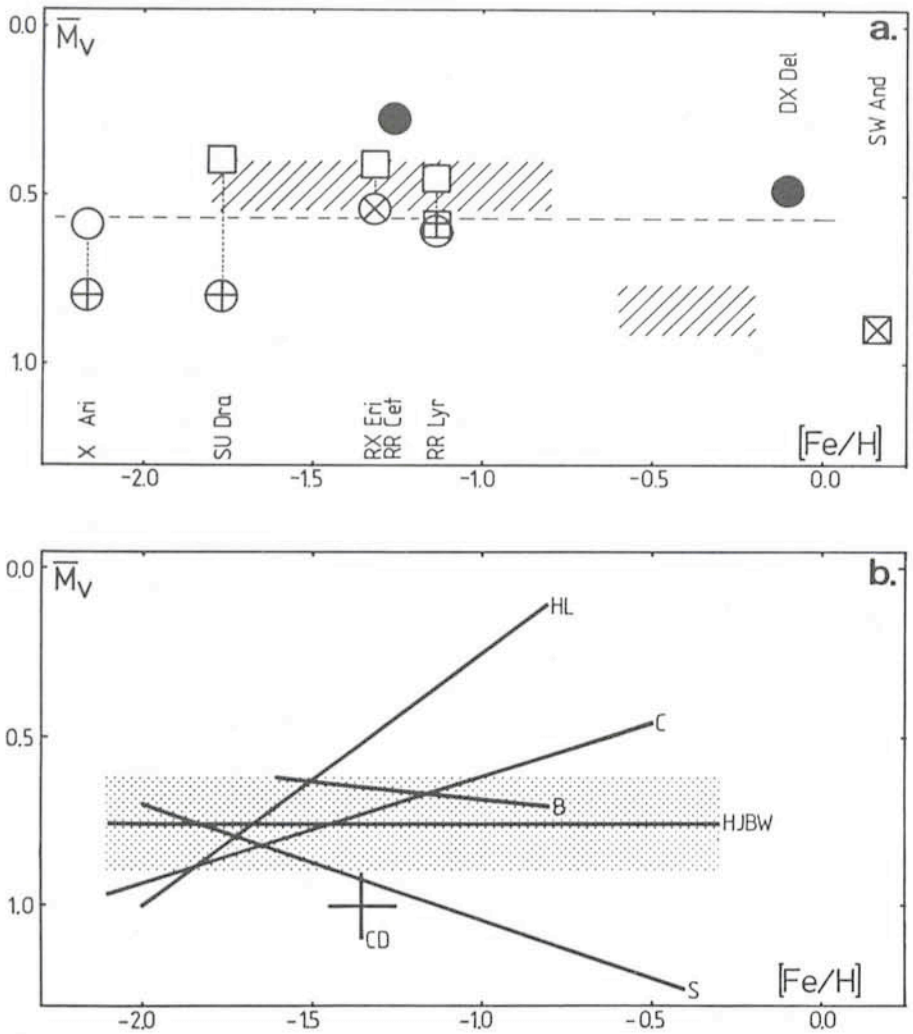

Figure 4: *The various determinations of $\overline{M}_v$ for RR Lyrae stars plotted versus [Fe/H]. The type of symbol refers to the authors of the $\overline{M}_v$ determination.*
(a) B-W method: • Burki and Meylan (1986), ○ Manduca et al. (1981), ⊕ Oke (1966) and Oke et al. (1962), ⊗ Woolley and Dean (1976), □ Siegel (1982), ⊞ Wallerstein and Brugel (1979), ⊠ McNamara and Feltz (1977); hatched areas: average of the determinations of McDonald (1981), Woolley and Savage (1971) and Woolley and Davies (1977). The horizontal line represents the mean value of $\overline{M}_v$ based on the 7 RR Lyrae stars.
(b) Globular clusters and statistical parallaxes: relations given by S for Sandage (1982), C for Carney (1980), B for Butler et al. (1978), HL for Heck and Lakaye (1978), CD for Clube and Dawe (1980), and HJBW for Hawley et al. (1986).

according to Sandage (1982). Although the sample at our disposal is still small, this effect can be evaluated as follows: the RR Lyrae stars of intermediate metallicity [Fe/H] $\simeq -1.2$ could be slightly brighter by about 0.2 magnitude than either those being very deficient or those having a solar composition.

(ii) *Determination based on globular clusters analysis.* Tremendous discrepancies exist between the determinations based on the B-W method (field stars) and on globular clusters (Figure 4b): the relation of Carney (1980), based on globular cluster main sequence fitting, is fainter by about 0.2 magnitude for stars with [Fe/H] ≤ -1.0 (C relation in Figure 4b), and the relation for globular clusters by Sandage (1982) is fainter by about 0.5 magnitude for stars with [Fe/H] ≥ -1.2 (S relation in Figure 4b). The case of ω Cen is interesting because there is a wide range of [Fe/H] values among its numerous RR Lyrae member stars. According to Butler et al. (1978), there is virtually no dependence of $\overline{M}_v$ on [Fe/H] for these stars. Their mean relation is drawn in Figure 4b (B relation), using 5.2 kpc for the distance to this cluster. The difference in magnitude between the mean B-W and mean ω Cen relations can be reduced to zero by adopting 5.5 kpc for the distance to this globular cluster.

(iii) *Determination based on statistical parallaxes.* The most recent analysis gives $\langle \overline{M}_v \rangle = 0.76 \pm 0.14$ (Hawley et al. 1986), without any significant dependence on metallicity (HJBW relation in Figure 4b). This mean value, fainter by about 0.2 magnitude than the mean B-W value $\langle \overline{M}_v \rangle = 0.57 \pm 0.09$, is nevertheless in agreement at the 1 σ level. The results of the studies of Heck and Lakaye (1978) and Clube and Dawe

List of ESO Preprints (December 1985– February 1986)

407. H. Quintana, R.E. de Souza and L. Arakaki: Morphological Subclustering and Mass Segregation in Galaxy Clusters. *Astronomy and Astrophysics.* December 1985.
408. A. Iovino and P.A. Shaver: Gravitational Lensing in the QSO Pair Q1548 + 114A, B. *Astronomy and Astrophysics.* December 1985.
409. A. Tornambè and A. Chieffi: Extremely Metal-Deficient Stars II. Evolution of Intermediate Mass Stars up to C-Ignition or Core Degeneracy. *Monthly Notices of the Royal Astronomical Society.* December 1985.
410. I. Manousoyannaki and G. Chincarini: The Infrared (H) Surface Brightness of Galaxies as a Function of the Morphological Type. *Astronomy and Astrophysics.* December 1985.
411. L. Woltjer: Recent Developments on the Crab Nebula. Proceedings of the Advanced Study Institute on "High Energy Phenomena Around Collapsed Stars", Cargèse, 2-13 September 1985. January 1986.
412. F. Matteucci: Some Considerations on the Origin of Nitrogen. *Monthly Notices of the Royal Astronomical Society.* January 1986.
413. M. Heydari-Malayeri and G. Testor: Detection and Study of Two HII Blobs in the LMC Giant HII Region N160 and Investigation of Their Nebular and Stellar Environment. *Astronomy and Astrophysics.* January 1986.
414. O. Stahl and B. Wolf: Circumstellar Shells Around Luminous Emission-Line Stars in the Large Magellanic Cloud.

(1980), are also displayed in Figure 4b (HL and CD relations).

7. Delta Scuti, SX Phoenicis Stars and the B-W Method

Figure 5 displays the photometric observations obtained through the 7 filters of Geneva photometry, concerning the Delta Scuti star BS Aqr. From top to bottom are drawn the U, B1, B, B2, V1, V, and G magnitude observations in function of the phase φ. The adopted origin of time is HJD 2440000. The scale in magnitude is given in the upper left corner. The fitted curve of the V magnitude is drawn.

For the same star, Figures 6a, 6b, 6c, and 6d display, from top to bottom, the observations and the fitted curves of the V magnitude, of the Geneva [B-V] colour index, of the radial velocity V_r, and of the 3 curves ΔR, $\dot{R}$, and $\ddot{R}$ describing the pulsation cycle. Very similar figures are obtained for the SX Phoenicis star DY Peg.

The comparison of the curves in Figures 5 and 6 concerning BS Aqr with those in Figures 1 and 2 concerning RR Cet, i.e. an RRab Lyrae star, induces the following remarks:

(i) The light, colours and velocity curves are more symmetric: 3 to 5 harmonics of the Fourier series are sufficient to describe the observed variations in luminosity and in radial velocity, instead of 15 to 20 for the two RR Lyrae stars.

(ii) The amplitudes are smaller.

(iii) The width of the peak in the $\ddot{R}$ curve is much larger, instead of 15% of the period in the case of RR Cet and DX Del.

(iv) No hump is observed on the light curve at the phase of minimum radius, which means that the perturbations of the stellar atmosphere by shock wave and/or by increase of the turbulence is less important in these Delta Scuti and SX Phoenicis stars than in RR Lyrae stars.

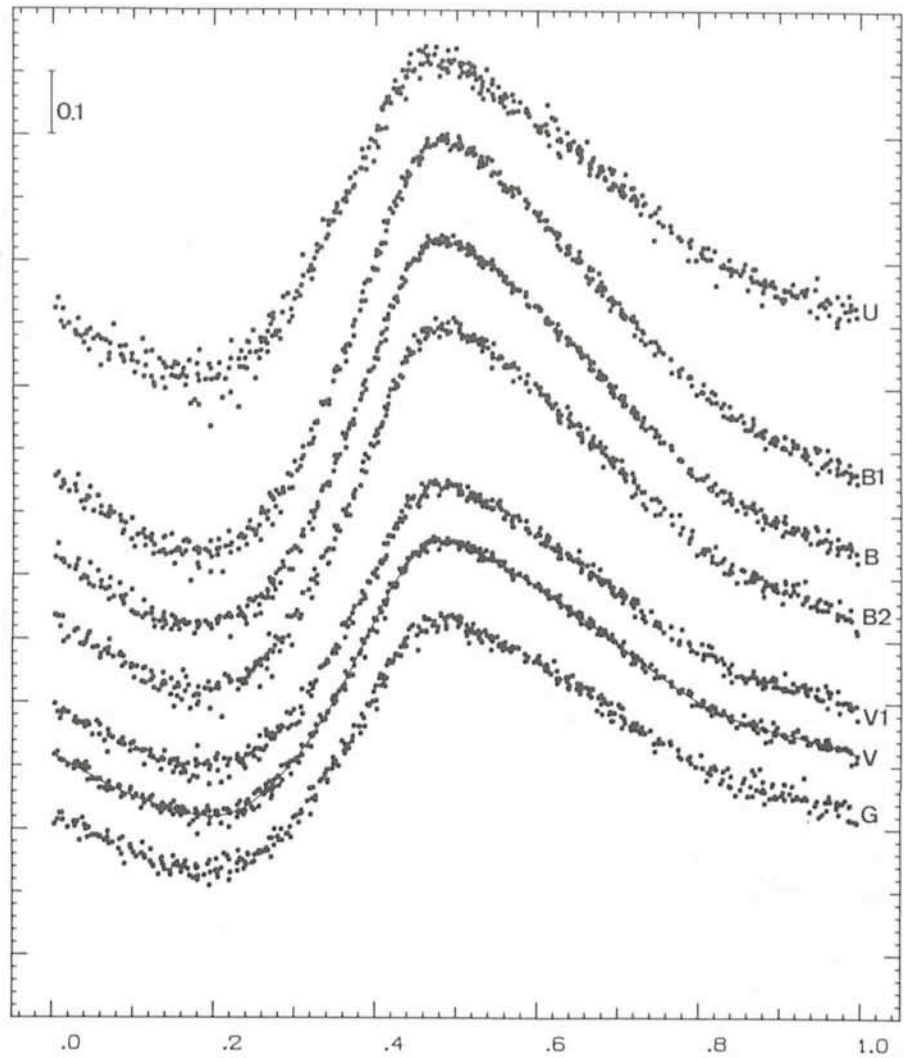

Figure 5: *Luminosity curves measured in the 7 filters of Geneva photometry for the Delta Scuti star BS Aqr.*

Various intervals of phase have been investigated: whole cycle, rising and diminishing light, increasing and decreasing radius. For both stars the R_0 value of the mean radius for the whole cycle

Astronomy and Astrophysics. January 1986.

415. J. Breysacher: Absolute Magnitudes and Evolutionary Status of Wolf-Rayet Stars. *Astronomy and Astrophysics.* January 1986.
416. U. Heber et al.: A Spectroscopic Study of HB Stars in the Galactic Globular Cluster NGC 6752. *Astronomy and Astrophysics.* January 1986.
417. J. Surdej et al.: Further Investigation of the Pair of Quasars Q0107−025 A and B. *Astronomy and Astrophysics.* February 1986.
418. D. Baade: Nonradial and Radial Oscillations Observed in Non-Emission Line OB Dwarfs and Giants. Invited talk presented at Joint Discussion III "Solar and Stellar Nonradial Oscillations" during the IAU XIX General Assembley in New Delhi (November 1985). To appear in "Highlights of Astronomy", Vol. 7. February 1986.
419. L.B. Lucy: Radiatively-Driven Stellar Winds. Paper presented at IAU Colloquium No. 89: Radiation Hydrodynamics in Stars and Compact Objects. February 1986.
420. P. Focardi, B. Marano and G. Vettolani: The Large Scale Distribution of Galaxies in the Linx-Gemini Region. *Astronomy and Astrophysics.* February 1986.
421. E.J. Wampler: The Iron Spectra of PG 1700+518 and PG 2302+029. *Astronomy and Astrophysics.* February 1986.
422. P.A. Shaver: Statistics of Quasar Pairs. *Nature.* February 1986.
423. D. Alloin et al. Recurrent Outbursts in the Broad Line Region of NGC 1566. *Astrophysical Journal.* February 1986.
424. S. di Serego Alighieri and M.A.C. Perryman: The Time-Resolved Imaging Mode (TRIM) of the ESA Photon Counting Detector. Paper presented at SPIE Conference on "Instrumentation in Astronomy VI", Tucson, 3-8 March 1986. February 1986.

STAFF MOVEMENTS

Arrivals

Europe:

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AZIAKOU, Patricia (F), Adm. Clerk Purchasing
BEELEN, Guido (B), Electronics Engineer
BUYTENDIJK, Felice (NL), Receptionist
GIRAUD, Edmond (F), Fellow
STANGA, Ruggero (I), Associate

Departures

Chile:

MÜLLER, Guido (CH), Electro-Mech. Engineer
FOING, B. (F), Fellow