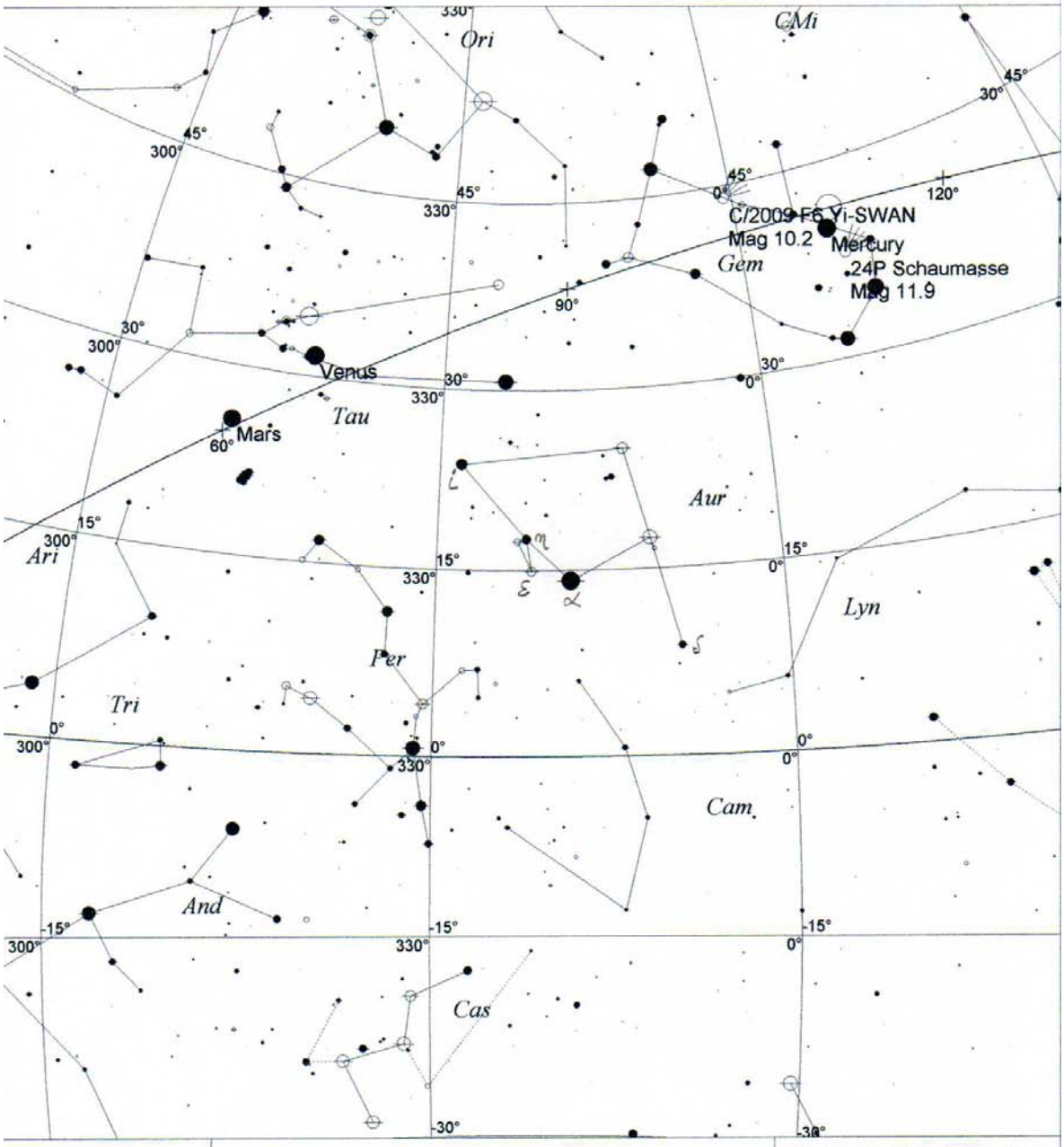
EPS Aur



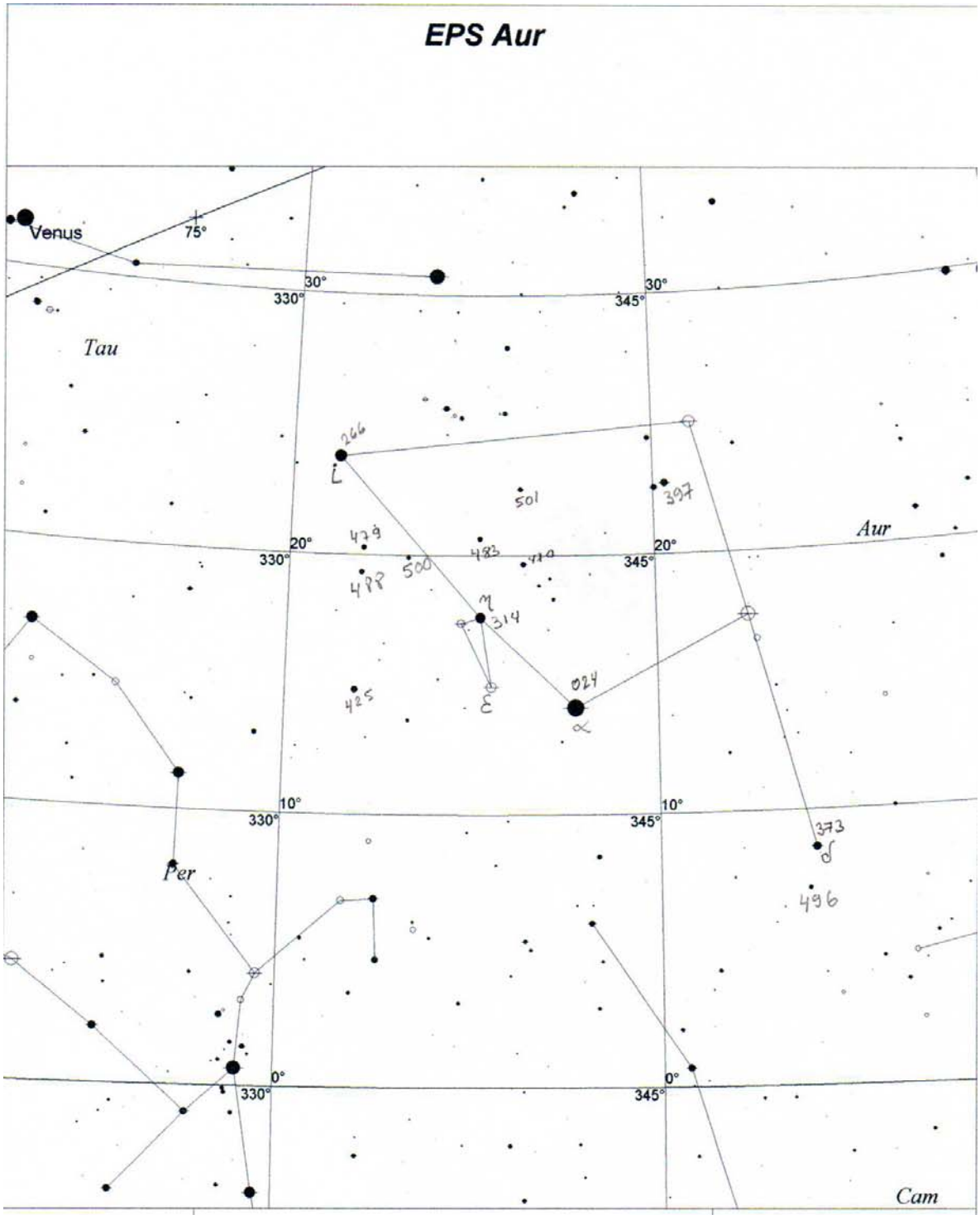
STARS
<1 >5.5
2
3
4
5

SYMBOLS
Multiple star
Variable star
Comet
Galaxy
Bright nebula
Dark nebula
Globular cluster
Open cluster
Planetary nebula
Quasar
Radio source
X-ray source
Other object

Prof. Dr. Raúl Roberto Podestá
Director del Observatorio NOVA PERSEI II

Local Time: 12:27:45 13-Jul-2009 UTC: 15:27:45 13-Jul-2009 Sidereal Time: 07:01:29
Location: 26° 10' 40" S 58° 12' 42" \RA: 5h02m39s Dec: +43° 50' Field: 90.0° Julian Day: 2455026.1443

EPS Aur



STARS

<1 · 6
2 >6.5
3
4
5

SYMBOLS

- Multiple star
- Variable star
- Comet
- Galaxy
- Bright nebula
- Dark nebula
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Local Time: 12:27:45 13-Jul-2009 UTC: 15:27:45 13-Jul-2009 Sidereal Time: 07:01:29
Location: 26° 10' 40" S 58° 12' 42" W RA: 5h02m39s Dec: +43° 50' Field: 40.0° Julian Day: 2455026.1443

EPS Aur

Summary

Maximum magnitude: 2.92
Minimum magnitude: 3.83
Type of variability: EA/GS
Spectral type: F0Ia
Distance: 2038 +/- 857 light years

Position information for 13 Jul 2009 12:27:45 p.m.
(Julian day number 2455026.14427)

Apparent RA (epoch of date): 05h 02m 39.00s
Apparent Dec (epoch of date): +43° 50' 11.7"
Constellation: Auriga

Altitude: +14° 56' 10"
Azimuth: 338° 17' 33"

Rise: 6h 18m 38s
Transit: 10h 29m 14s
Set: 14h 39m 51s

Names and Catalog Numbers

Bayer letter: ε Aurigae
Flamsteed number: 7 Aurigae
GCVS catalog number: epsilon Aurigae
Tycho catalog number: TYC 2907-1275-1
Hipparcos number: HIP 23416
Henry Draper number: HD 31964
DM number: BD +43 1166
PPM number: PPM 47627
SAO number: SAO 39955
Bright star number: HR 1605
WDS designation: BU 554

Star Atlas Chart Numbers

Herald-Bobroff Astroatlas, Chart C-35
Millennium Star Atlas, Charts 93-94 (Vol I)
Sky Atlas 2000.0, Chart 5
Uranometria 2000 Chart 65, Vol 1

Yale Bright Star Catalog Data

Preliminary Version of the Bright Star Catalogue, 5th Revised Edition. Dorrit Hoffleit, Department of Astronomy, Yale University, Wayne H. Warren Jr., ST Systems Corporation, National Space Science Data Center, NASA Goddard Space Flight Center (1991)

Bright star catalog number: HR 1605

Position:

RA (J2000.0): 05h 01m 58.1s
Dec (J2000.0): +43° 49' 24"

RA (B1900.0): 04h 54m 47.4s
Dec (B1900.0): +43° 40' 32"

Galactic coordinates (system II):

Longitude: 162.79°
Latitude: 1.18°

Magnitude and spectral information:

Magnitude: 2.99 [V on UBV (Johnson) system]
B-V on Johnson system: +0.54
U-B on Johnson system: +0.33
R-I: +0.45 (on Johnson system)

Spectral type: F0Iae+B (C)

Annual proper motion for J2000.0 on FK5 system:
RA: -0.001"
Dec: -0.004"

Trigonometric parallax: +.007"
Heliocentric radial velocity: -003 km/sec
Radial velocity comments: Spectroscopic binary; single-lined spectra; orbital data available
Projected rotational velocity (v sin i): 29 km/sec

Double/Multiple star information:

ADS catalog number (Aitken 1934): ADS 3605

Component data:

Identification: AE
Magnitude difference: 6.2
Separation: 207.6"
Total number known: 6

Variable star designation: Eps Aur

Cross references to other catalogs:

Durchmusterung: BD+43 1166
Henry Draper catalog: HD 31964
SAO catalog: SAO 39955
FK5 catalog: 183
Infrared source: NASA Merged Infrared Catalogue, Schmitz et al. 1978.

Remarks

Double/multiple stars: ADS 3605A. A* 2.98 var. A8Iap. Five visual and one astrometric components. AB visual binary, B, 14v at 29"; C, 11.26V, +1.83(B-V), +1.31(U-B), at 43"; D, 12.0v at 46".

Names: Al Anz; Almaaz.

Spectra: Shell star. Also classified A8Ia-F2epIa + B.

Spectroscopic binary: ADS 3605A, 9890d, K 15.0k/s, V0 -1.4k/s, msin3i 16.8, asini 2000. Unresolved by speckle interferometry.

Variability: ADS 3605A, EA 2.94 - 3.83V, 9892d. Spectrum var. even outside eclipse. RV and light fluctuations about 110d.

Hipparcos Catalog Data

Hipparcos Catalogue (ESA SP-1200, 1997).

Hipparcos Identifier/Proximity Flag

Catalog number: HIP 23416

Proximity flag: None

Descriptor

V magnitude: 3.03
This star entry is variable at a level of 0.06 to 0.6 mag

Source of V magnitude: Median Hipparcos magnitude (Hp), combined with information on the colour index (either V-I or Bt-Vt), in combination with the luminosity class.

Main Mission Astrometric Data

Equatorial coordinates (epoch J2000.0, ICRS)

RA: 05h 01m 58.1341s
Dec: +43° 49' 23.910"

The specified RA/dec coordinates refer to the centre of mass of a double or multiple system.
Standard errors of the equatorial coordinates (epoch J1991.25)

RA: 0.00096 arcsec
Dec: 0.00064 arcsec

Trigonometric parallax: 0.00160 arcsec
Standard error of the parallax: 0.00116 arcsec

Proper motion components (epoch J1991.25, ICRS)

RA: +0.00025 arcsec/yr
Dec: -0.00231 arcsec/yr

Standard errors of the proper motion components

RA: 0.00140 arcsec
Dec: 0.00076 arcsec

Radial velocity: -2.5 km/sec

Percentage of data that had to be rejected to obtain an acceptable astrometric solution (F1): 0%

Goodness-of-fit parameter (F2): 1.74

Tycho Photometry and Colour Indices

Mean magnitude in the Tycho photometric system, Bt: 3.665
Standard error of the Bt magnitude: 0.007

Mean magnitude in the Tycho photometric system, Vt: 3.091
Standard error of the Vt magnitude: 0.005

Johnson B-V colour index: 0.537
Standard error: 0.008
Source of B-V value: Determined from the transformed Tycho Bt-Vt data.

Cousins' V-I colour index: 0.61
Standard error: 0.01
Source of V-I value: Method L

Main Mission Photometry

Median magnitude in the Hipparcos photometric system, Hp: 3.1457
Standard error in median magnitude: 0.0062 mag
Scatter of Hp observations: 0.036 mag
Number of Hp observations: 67

Main Mission Variability

Observed magnitude at maximum and minimum luminosities:

Mag at max, Hp: 3.05 (5th percentile)
Mag at min, Hp: 3.20 (95th percentile)

Type of variability: periodic variable.

Variability data for this star, such as periods, amplitudes, reference epochs, etc, compiled from the Hipparcos Hp data, along with associated ground-based data, are given in the table of periodic variables in the Hipparcos Variability Annex.

A light curve for this star, compiled from the Hipparcos Hp data, is provided in the Hipparcos Variability Annex. A light curve (not folded) is given in Volume 12, Part C. This part generally corresponds to unsolved systems, with conspicuous features in their light curves, independent of amplitude. It includes irregular or semi-irregular variables.

Multiplicity Data

CCDM identifier (J2000.0): 05020+4350

Historical status of CCDM identifier: The system had been previously identified as double or multiple, as given in Annex 1 of the Hipparcos Input Catalog.

Number of components into which the entry was resolved as a result of the Hipparcos observations and data reduction: 1

Further details of this system are given in one of the five (mutually exclusive) parts of the Hipparcos Double and Multiple Systems Annex. This entry has the following type of solution: orbital solutions; for a few hundred systems observed with Hipparcos it has been possible to determine at least one of the orbital elements from the space observations, in addition to the five astrometric parameters referring to the centre of mass. The remaining orbital elements, varying in number from zero to seven, had to be adopted from ground-based data such as the published orbits of spectroscopic binaries. The main results on the orbital elements are given in the annex, while the astrometric parameters for the centre of mass are given in the main catalog.

Miscellaneous

This is a "survey" star.

This entry has the following notes in the printed Hipparcos catalog:
Double and multiple systems note (Volume 10).

Cross-identifications:

HD identifier: HD 31964
DM identifier: BD +43 1166

V-I colour index used for the photometric processing of this entry: 0.61 mag

Spectral type: F0Ia
Source of spectral type: miscellaneous.

Tycho 2 Catalog Data

Tycho 2 Catalogue (E.Hog et al., 2000).

Catalog number: TYC 2907-1275-1

Magnitude: 3.02 (Johnson V mag)
B-V colour index: +0.489 mag

Equatorial coordinates (epoch J2000.0, ICRS)

RA: 05h 01m 58.1359s
Dec: +43° 49' 23.929"

Trigonometric parallax: 0.00160 arcsec
Standard error of the parallax: 0.00116 arcsec

Radial velocity: -2.5 km/sec

WDS Catalog Data

Washington Double Star Catalog, 2001. (Brian D. Mason, Gary L. Wycoff, William I. Hartkopf, Geoffrey G. Douglass, and Charles E. Worley, Astrometry Department, U.S. Naval Observatory, 3450 Massachusetts Ave, NW, Washington, DC 20392, USA)

Discoverer's reference: BU 554
Observer: Burnham, S.W.

This star has 4 component records.

Component: AB

RA (J2000.0): 05h 02.0m
Dec (J2000.0): +43° 49'

Number of measurements: 5

Date of first observation: 1878
Position angle: 225°
Separation: 29.3"

Date of last observation: 1925
Position angle: 224°
Separation: 28.6"

Magnitude of first component: 2.99
Magnitude of second component: 14.00
Spectrum: F0Iae

Proper motion in RA: -0.001 "/year
Proper motion in dec: -0.004 "/year

Catalog number: BD +43 1166

Notes:

AB: Epsilon Aur. A is a enigmatic supergiant eclipsing system.

Coordinates and proper motions are from the ACRS, PPM, IRS, and FK5 catalogs.

Component: AC

RA (J2000.0): 05h 02.0m
Dec (J2000.0): +43° 49'

Number of measurements: 7

Date of first observation: 1878
Position angle: 275°
Separation: 42.9"

Date of last observation: 1989
Position angle: 276°
Separation: 42.9"

Magnitude of first component: 2.99
Magnitude of second component: 11.26

Component: AD

RA (J2000.0): 05h 02.0m
Dec (J2000.0): +43° 49'

Number of measurements: 5

Date of first observation: 1879
Position angle: 317°
Separation: 46.4"

Date of last observation: 1925
Position angle: 317°
Separation: 45.0"

Magnitude of first component: 2.99
Magnitude of second component: 12.00

Component: AE

RA (J2000.0): 05h 02.0m
Dec (J2000.0): +43° 49'

Number of measurements: 3

Date of first observation: 1913
Position angle: 48°
Separation: 207.6"

Date of last observation: 1989
Position angle: 48°
Separation: 210.8"

Magnitude of first component: 2.99
Magnitude of second component: 9.20

Proper motion in RA: 0.009 "/year
Proper motion in dec: 0.002 "/year

Catalog number: BD +43 1168

Notes:

Coordinates and proper motions are from the ACRS, PPM, IRS, and FK5 catalogs.

Binary Star Orbit Data

Fifth Catalog of Orbits of Visual Binary Stars (William I. Hartkopf, Brian D. Mason, & Charles E. Worley, Astrometry Department, U.S. Naval Observatory, 3450 Massachusetts Ave, NW, Washington, DC 20392, USA)

WDS designation: eps Aur
Aitken double star catalog number: ADS 3605
Henry Draper catalog number: HD 31964
Hipparcos catalog number: HIP 23416

Magnitude of first component: 3.04

Orbital period: 27.06971 years
Semi-major axis: 0.02240"
Inclination: 87.00°
Node: 264.00°
Date of periastron passage: 1950.24915
Eccentricity: 0.0700
Longitude of periastron: 0.00°

Grade of orbit: 9 - Could not be graded, due to a lack of rho and theta measures in the WDS. This is an astrometric orbit; these orbits tend to give rather poor fits to any later resolved measures.

Position computed from this orbit:
Position angle: 275.9° (J2000.0)

Separation: 0.01"

Notes:
- Astrometric solution adopting some elements from the orbit of Heintz & Cantor (1994).

General Catalog of Variable Stars Data

General Catalogue of Variable Stars, 4th edition. (Kholopov et al. 1985-88)

Name: ε Aurigae

This star has a remark in the printed GCVS catalog.

Position for epoch J2000.0:
RA: 05h 01m 58s
Dec: +43° 49.4'

Galactic coordinates (system II):
Longitude: 162.79°
Latitude: 1.18°

Bibliographical references:
Study for the star: 06447
Chart or photograph of the variable's field.: BD

Type of variability: EA/GS

Maximum magnitude: 2.92
Minimum magnitude: 3.83
Magnitude photometric system: V

Epoch: JD 2435629. (04 Jun 1956 12:00:00 p.m.)
Period: 9892. days
Duration of light increase from minimum to maximum (M-m) for physical variables, or the duration of eclipse (D) for Algol-type stars: 8% of period

Spectrum: A8IA-F2EPIA+BV

Variable star classification: EA

Eclipsing binary systems. These are binary systems with orbital planes so close to the observer's line of sight (the inclination i of the orbital plane to the plane orthogonal to the line of sight is close to 90 deg) that both components (or one of them) periodically eclipse each other. Consequently, the observer finds changes of the apparent combined brightness of the system with the period coincident with that of the components' orbital motion.

Algol (Beta Persei)-type eclipsing systems. Binaries with spherical or slightly ellipsoidal components. It is possible to specify for their light curves the moments of the beginning and end of the eclipses. Between eclipses the light remains almost constant or varies insignificantly because of reflection effects, slight ellipsoidality of components, or physical variations. Secondary minima may be absent. An extremely wide range of periods is observed, from 0.2 to >= 10000 days. Light amplitudes are also quite different and may reach several magnitudes.

Variable star classification: GS

Systems with one or both giant and supergiant components; one of the components may be a main sequence star.