Exercise	1	2	3a	3b	3c	3d	3e	3f	Total
100%	5	5	2	2	1	1	3	1	20
Points									

Stellar Astrophysics

Homework - Lecture 2 - parallax, magnitude scale

Due date:

1 Parallax

The parallax angle for Sirius is 0.377"

Find the distance to Sirius in units of
(a) parsecs; (b) light-years; (c) AU; (d) cm

(e) Determine the distance modulus for Sirius

2 Magnitude scale

The galaxy NGC 4388 is about 20 Mpc[1] away. Its apparent magnitude is $B = 11.9\,\mathrm{mag}$. Assume that NGC 4388 would consist only of stars like the sun[2], what would the mass of NGC 4388 be?

3 Paper discussion

Read the paper by Benedict et al. (2003): "Astrometry with the Hubble Space Telescope: A parallax[3] of the central star of the planetary nebula NGC 6853"

Remember what was said in the lecture: you do not have to read the paper sentence by sentence; skip passages which you think are not important for your understanding, skip numbers and references you do not need etc. Concentrate on the major points and on the questions below.

(a) Check the correct answer below:

NGC 6853 CS's surface temperature is ◯ hotter ◯ cooler
than that of the sun.

[1] $1\,\mathrm{Mpc} = 10^6\,\mathrm{pc}$

[2] Schmidt & Kaler (1982): sun has $M_V = +4.83$ and $B - V = 0.64$

[3] in this paper the parallax is given in mas. $1\,\mathrm{mas} = 0.001\,\mathrm{arcsec} = 0.001''$

NGC 6853 CS's radius is ◯ larger ◯ smaller than that of the sun.

NGC 6853 CS is a
◯ red giant ◯ large white dwarf ◯ small white dwarf ◯ planetary nebula

NGC 6853 is a
◯ red giant ◯ large white dwarf ◯ small white dwarf ◯ planetary nebula

(b) Which instruments were used for what kind of measurement by Benedict et al.?

(c) What (absolute/apparent) magnitude does the central star in the planetary nebula have?

(d) Compared to the sun, how much brighter/fainter is this star?

(e) What factors add to the uncertainty of the absolut magnitude of this star? How do they influence the result?

(f) How large is the gravity at the surface of NGC 6835 CS in earth units ($g_{earth} = 981\,\mathrm{cm\,s^{-2}}$)

Questionnaire

How much time did you spend on this homework?

How much time on reading the paper?

What kind of homework do you prefer (check one) ?
◯ homework like exercise 1 and 2
◯ homework like exercise 3
◯ a mixture like in this homework

How did you do the homework (check one) ?
◯ entirely on my own
◯ together with other students in the course
◯ I asked a more advanced student to help me

How would you rate this homework (check one[4]) ?
◯ too easy
◯ easy
◯ medium
◯ difficult
◯ too difficult

[4]Note: checking "too difficult" does not mean that the homework will automatically be easier next time...