

# Star Properties by calculations from information found by a SIMBAD query

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## Definitions:

### 1. Coordinates

Right Ascension and Declination:

### 2. The Distance to your star

The distance  $D$  to the star is inversely proportional to the parallax, given in milliarcseconds (mas), with the uncertainty in the value given in brackets.

$D$  in parsecs =  $1/(\text{parallax in seconds of arc}) = 1000/(\text{parallax in milliarcseconds})$

$D$  in light years = \_\_\_\_\_ x  $D$  in parsecs

Calculate the distance and its uncertainty (+, -, %)

### 3. The color of the star is the difference between Blue and Visual magnitudes, usually B-V.

Do bluish stars have a color index which is negative or positive?

### 4. The true space velocity of the star is a combination (vector sum) of its radial velocity and its tangential velocity.

The proper motion is an angle given in mas/year, the first one ( $\mu_a$ ) for RA and the second one ( $\mu_d$ ) for Declination.

The total proper motion is  $\mu = \text{SQRT}((\mu_a \cos \text{Dec})^2 + (\mu_d)^2)$

$V$  tangential in km/s =  $4.74 (\mu \text{ in arcsec/yr}) (D \text{ in parsecs})$

The total space velocity is just  $\text{SQRT}((V \text{ tangential})^2 + (V \text{ radial})^2)$

## Procedure:

For the alpha star in your constellation

- Check that the coordinates listed by SIMBAD agree with the coordinates on both of your star atlas prints.
- Calculate its distance and uncertainty
- Calculate its color index
- Calculate its total proper motion, tangential velocity, and true space velocity.