STELLAR PARALLAX-ABERRATION IS GEOCENTRIC

Prof. James Hanson

Stellar parallax and stellar aberration are considered to be two separate phenomena that both demonstrate the earth's orbital motion about the sun. Here we argue that parallax and aberration are not separate but a single phenomenon that is not due to the earth's motion, but due to properties of space between a geocentric earth and distant stars. Furthermore, a small, shelled, universe is supported but not required.

Copernican (heliocentric) parallax and aberration

We shall adopt the following symbols and quantities:

r = earth-sun distance = $1.50 \bullet 10^{13}$ cm.
R = heliocentric distance to a star (assumed the same as the geocentric distance, also, due to the great distance to a star).
1"= one arc second = $4.84 \bullet 10^{-6}$ radians.
c = speed of light = $3 \bullet 10^{10}$ cm/sec.
T = 1 year = $3.16 \bullet 10^{7}$ sec.
$a = 2p/T = 1.99 \bullet 10^{-7}$ sec^{-1}.
1 ly = one light year = $9.47 \bullet 10^{17}$ cm.
A = heliocentric angle in ecliptic plane from the star direction to earth.
j = apparent deflection of starlight due to parallax and aberration $= j_1 + j_2$.
j_1 = component of j due to parallax.
j_2 = component of j due to aberration.

In the Copernican model, parallax and aberration are separate deflections of starlight from its straight-line path and their sum gives the total observed deflection. Figure 2 shows the earth, at E, moving around the sun, at O. For simplicity, the earth's orbit will be taken as circular since an imperceptible portion of aberration would be due to eccentricity. The earth moves counterclockwise through an angle $A = a\,t$ where t is time and $a = 2p/T$. The vector $r = (r \cos at,\ r \sin at)$ is the earth's position and $\boldsymbol{v}$ its velocity. The vector $\boldsymbol{u}$ is perpendicular to the direction of a star, at S, and will be taken to be vertical due to the star's great distance. The star is at distance R from the sun on the horizontal axis. The deflection angles j_1, j_2 and $j = j_1 + j_2$ are the parallactic deflection, aberrational deflection, and the total deflection respectively. For simplicity, the star lies in the plane of the earth's motion, the ecliptic plane.

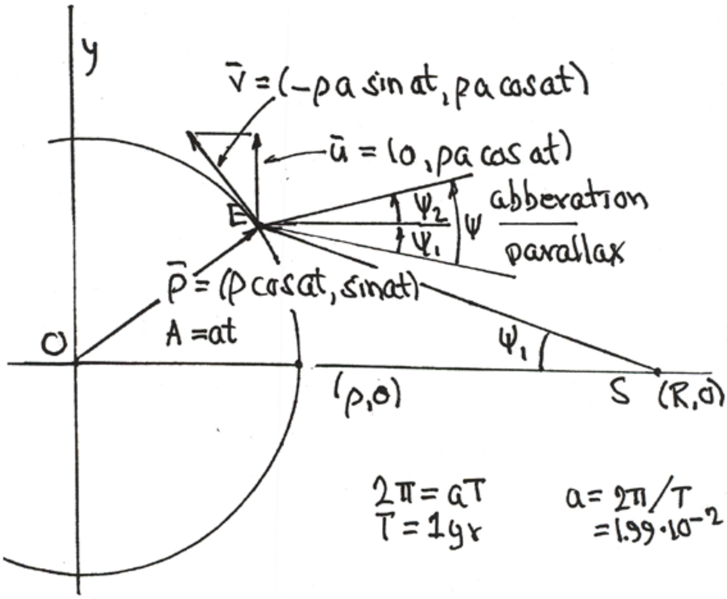

Figure 1

The law of sines for the triangle OES gives the parallax as

$$j_1 \approx \sin j_1 = (r \sin at)/R.$$

The direction $\boldsymbol{u}$ is perpendicular to the star's direction and is approximated by

$$\boldsymbol{U} \approx |\boldsymbol{v}| \cos A \quad \text{which at } (0,1) = (0,\ r\,a \cos at).$$

Hence the aberration is the angle with $r\,a \cos at$ and the velocity of light, c, as legs of a right triangle,

$$j_2 \approx \sin j_2 = r\,a \cos at\,/\,c$$

Therefore the total deflection is

$$j = j_1 + j_2 = (r/R) \sin at + (r\,a/c) \cos at.$$

A graph of j vs. t indicates a maximum at

$$T_{\max} = (T/2\pi) \tan^{-1} (cT/2pR), \quad A_{\max} = (at)_{\max}$$

For α Centauri, R = 4.43 l.y. = $4.05 \bullet 10^{18}$ cm from which $A_{\max}$ = $1.5 \bullet 10^{13}/4.05 \bullet 10^{18} = 0.037 \bullet 10^{-4}$ rad = $2^{\circ}.1 \bullet 10^{-4}$, and the parallax = r/R = 0".751.

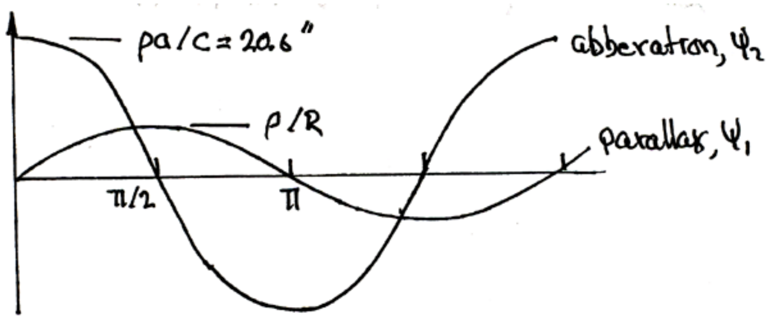

Figure 2

Geocentric parallax-aberration

Cosmologists are fond of depicting space as "algebraic" (curved) space, meaning that they have assumed things (e.g., distance, light, gravity) more along certain metrics, e.g., the Riemannian metric. I regard this as just another mathematical obscuration. The Bible tells us that God created space (Gen. 1:1) and filled it with the firmament, or æther (Gen. 1:7), and that distances are measured in a Euclidian fashion, i.e., by height, width, and length (Eph. 3:18). It will be assumed here that light and the æther (firmament) behave as an ideal fluid. Specifically, its path is a contour of a diffusion (fluid) process; hence, in the plane we may use the theory of a complex conformal map. The analysis will be restricted to two dimensions (i.e., in a plane) so as to benefit from the method of sources and sinks of complex variable theory which reduces the problem to algebraic manipulation.

Let the earth be at the origin, $Z_3 = (0,0)$, the sun at $Z_2 = (r \cos at, r \sin at)$ and a star at $Z_1 = (R,0)$. Let the sun be represented by the doublet (source-sink) plus a vortex (Figure 3). Hence its complex potential is:

$$F_1 = A_1 \log (z - r \cos at - \mathrm{i} r \sin at)$$
$$+ \mathrm{i} A_1' \log (z - r \cos at - ir \sin at)$$

where, as usual, i denotes the square root of –1, and A_1 denotes the doublet strength and A_1' denotes the vortex strength. Let the star's potential be

$$F_2 = A_2 \log (z - R)$$

where A_2 is the star's source strength.

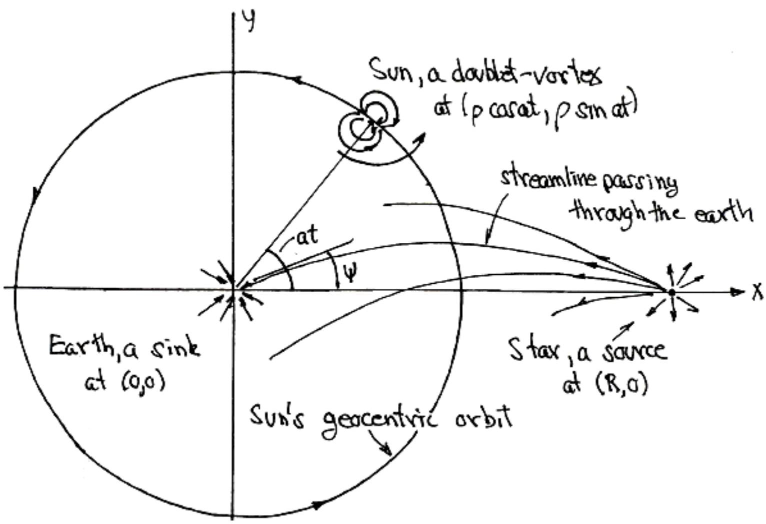

Figure 3

Let the earth be a sink of strength

$$F_3 = A_3 \log (z - 0).$$

Hence the total complex potential for this flow is

$$F = F_1 + F_2 + F_3.$$

The imaginary part of this will be the streamlines,

$$\text{Imag}(F) = A_1 \text{ atan } ((y\text{-}r \sin at)/(x - r \cos at)) \\ + 0.5\, A_1' \log ((x - r \sin at)^2 + (y - r \sin at)^2) \\ + A_2 \text{ atan } (y/(x\text{-}R)) + A_3 \text{ atan } (y/x),$$

which is observed to be constant.

The line of sight from the earth to the star is the x-axis. Therefore, the angular deflection of the starlight will be $dy/dx \equiv y'$ evaluated at (0,0). Hence differentiating this expression and then setting x=y=0 and solving for $y' \equiv y'(0,0)$, gives:

$$y' = \frac{(A_1/R) \sin at - (A_1'/R) \cos at}{(A_1/R) \cos at - (A_1'/R) \sin at - A_2/R}.$$

But $y' = \tan\, j$, hence since j is very small,

$$j = (-(A_1/A_2)(R\,/r)) \sin at + ((A_1'/A_2)(R\,/r) \cos at \qquad (1)$$

where small terms have been omitted and the earth's effect, A_3, cancelled out when x and y were set to zero.

Conclusion and remarks

It will be noted that both the Copernican and geocentric models give the same form for the net angular deflection of starlight from the line of sight,

$$j = \text{constant}_1 \sin at + \text{constant}_2 \cos at.$$

The source, sink, and vortex strengths can be selected so that the geocentric coefficients give the same numerical value as the Copernican. In the geocentric model there is a single deflection dependent upon how the space intervening between the earth and the star transmit the starlight. And since the geocentric coefficient equivalent to the Copernican aberration term contains the stellar distance, it would suggest the stellar firmament to be a shell of no great distance. Furthermore, this term is shown to be a property of space as required by Airy's failure.

In the Copernican model, additional aberrational and parallactic terms arise from the barycentric and elliptical motions of the earth with respect to the sun and moon. Our geocentric analysis can be made to accommodate this by adding triplets, fourth order, etc. terms to the sun's and earth's complex potentials. Furthermore, these doublet etc. terms can be oriented and rotated, etc. The moon's complex potential could be added. In this way, we could construct any streamline we wish, i.e., we can replicate any $j = \tan(\mathrm{d}y(0,0)/\mathrm{d}x)$. In fact, the proper motion of stars could likewise be incorporated to be a star's light property and not a measure of its space motion.

The model proposed herein is strictly geocentric; it does not invoke the Tychonian model which I find to be implausible, troublesome, and not found in the Bible. In this model the earth is a universal sink for starlight and might be expected to heat up too much over cosmological time. This same objection was brought to bear against Le Sagean type gravity. The answer to both is: that the earth was created to last for 7,000 years and not billions.

If, indeed, parallax cannot be separated then we must wonder what parallax measurements are measuring and can they be the basis for nearby stellar distances. This brings to question cosmological distances since they are all based on parallax measurements of a handful of close stars.

Editor's Comments

Before I add my comments, let us first review the terms that appear in the equation (1) on page 81.

A_1 = the doublet strength (remotely analogous to a magnet's north and south poles) of sun's light-dragging (gravitational) flow. Note that the doublet rotates and revolves.

A_1' = the vortex (like a whirlpool) strength of the sun's light-dragging (gravitational) flow.

A_2 = the strength of the star's outward flow of light.

a = the angular velocity of the sun about the earth. I.e., the rate at which the earth-sun line rotates about the earth.

R = the distance from the earth to the star.

r = the distance from the earth to the sun.

j = the deflection of starlight due to the flows from the star and the sun, which deflections are attributed to parallax and aberration.

t = time.

Prof. Hanson's approach is intriguing, but there are some drawbacks. For instance, according to equation (1) on page 81, the further the star is away from the earth (i.e., the larger R is), the larger its "aberration" and "parallax," i.e., its "parallax-aberration" will be. Furthermore, since the "parallax" component (first term) is observed to be much smaller than the "aberration" (the second) term, and since both have the star's flow, A_2 in the denominator, $A_1' \gg A_1$, which precludes the usual assumption of equipartition of energy. Furthermore, since both $R \gg r$, in particular, $R > 40r$, the average distance Pluto's orbit is from the sun, and $A_1' \gg A_1$, the flow from the star must be significantly greater than the flow from the sun.

Finally, until we actually get close to a star, which may not be too many years from now if the distance scale required by the model is correct, we can never hope to derive the distance to any star. We can measure three things, the earth-sun distance, r, a, and t. From those three we need to derive values for A_1, A_1', A_2, and R: three equations in four unknowns, which means that these values cannot be derived from existing observations. If we can find out more about the solar doublet vortex, we may be able to solve for stellar distances. The question now lies in interpreting the solar values; do they constitute solar wind, and solar radiation, or are they something else? Therein lies the uncertainty.

Author's Reply

I cannot disagree with the Editor's comments in that my model may prescribe strange circumstances for stellar "strengths" and distances. I never attempted to clearly define "strength" or to calculate values for my coefficient underlying variables. This I could have done by insisting that the velocity of light in the earth's vicinity was the speed of light. My main thesis was that we do not know the properties of space and that aberration and parallax are just properties of this space and are not necessarily two separate phenomena. I could have used another, though mathematically more complicated, model and had obtained different constitutive expressions for the two coefficients. E.g., I could have regarded space as treating light from stars as obeying Fermat's Principle (generalized Snell's Law[1]) whereby light follows that path which minimizes the integral of the index of refraction. In that case, I am at liberty to assign the index of refraction as a function of special coordinates and thereby produce whatever paths I want, and especially those paths which give the desired angle, j. Other models might also be considered.

[1] Basically, Snell's Law says light always follows the easiest path, not necessarily the shortest. —*Ed*.