

Bessel, Henderson, & Struve—24 Sept

1. You are a young astronomer in 1814. What problem do you want to study?
 - In 1814, Madison evacuated Washington, DC before the British attack.
 - Napoleonic Wars



Friedrich Bessel
1784-1846
hsci.cas.ou.edu/images/thumbnail/19thCentury/Bessel/

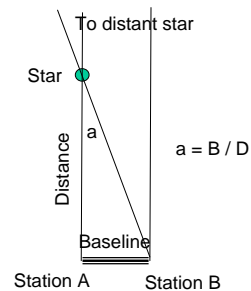
F G Wilhelm Struve
1793-1864
www.obs.ee/obs/pildid.html

Thomas Henderson (1798-1844).

- Half of Test 1 has been graded.
- Find out about the astrophysics major
 - Planning for undergraduate degree
 - Plan for graduate school (usually free with a stipend)
 - Mon, 29 Sept, 6:00pm, 1400 BPS
 - Pizza
- Bob Victor's sky preview 2008-2009
 - September 26-28, Fri & Sat at 8:00 pm, Sun at 4:00 pm.
 - A show highlighting the current sky, spectacular gatherings of Venus with the moon and other planets in coming months. See what Galileo saw through his telescope 400 years ago— the Milky Way and the Pleiades, details on the moon, the four moons of Jupiter, the phases of Venus, and the mysterious disappearance of Saturn's rings.
 - See Venus before the show and Jupiter after the show.

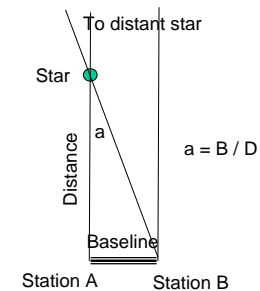
Bessel, Henderson, & Struve Measure Distances of Nearest Stars

- Parallax angle
angle = baseline / distance
 - For the great distances of the stars, the angles are small and difficult to measure
2. You are a young astronomer in 1825. What baseline should you choose?



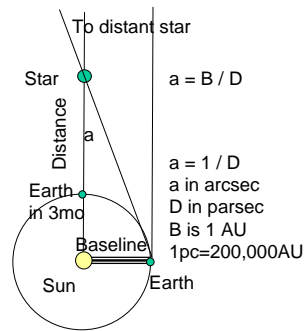
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2. You are a young astronomer in 1825. What baseline should you choose?
 - A. London to South Africa
 - B. Paris to Cayenne
 - C. Earth and Earth 6 months later

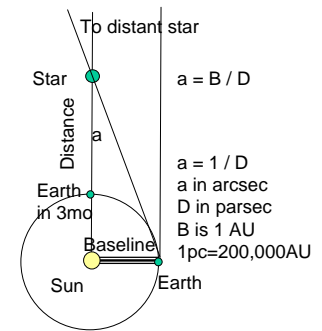


Definitions

- Angles are measured in arcseconds (arcsec)
 - An arcminute is 1/60 degree
 - An arcsecond is 1/60 arcminute
- Distances to stars are measured in parsec
 - 1 pc = 200,000AU
 - Nearest stars are about 1 pc away.
- With a baseline of 1 AU
 $a = 1/D$
 if angle a is in arcsec and distance D is in parsec.

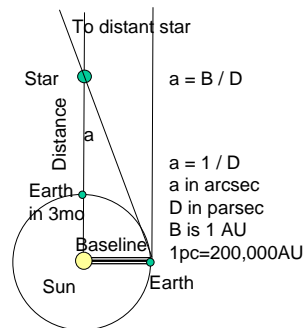


4. You are a young astronomer in 1825. Measuring the distance to one star requires years of work. What type of star should you choose to likely get a close one?



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- A bright one
- A faint one
- A fast one
- A slow one



First distances of stars 1837

- Thomas Henderson in South Africa
- Wilhelm Struve in Dorpat, now in Estonia
- Frederick Bessel in Königsberg, now in Russia

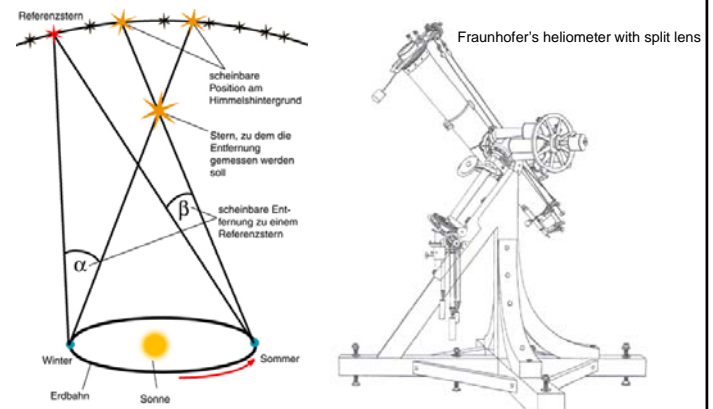
	Star	Char	Parallactic ang [arcsec]	Dist [pc]
Bessel	61 Cyg	Proper motion 5arcsec/yr	0.29	3.4
Struve	Vega	Bright	0.12	8.3
Henderson	α Cen	Bright	0.75	1.3

F G Wilhelm Struve

- Petition to Prince Lieven, Chancellor of University of Dorpat: "The opportunity to acquire this instrument, the possession of which would raise our observatory to one of the first in Europe, perhaps will never return."
- The Great Refractor built by Fraunhofer arrived in 22 crates in 1824, and the city of Dorpat celebrated.
- Czar Alexander I sent diamond rings to Struve & Fraunhofer.



Friedrich Bessel



pluslucis.univie.ac.at/FBA/FBA99/Neho/3_1_1_.htm

Summarizing Question

- What was known about the universe in 1850 that was not known in 1814?