The Heliocentric (centred on the Sun) parallax of a star

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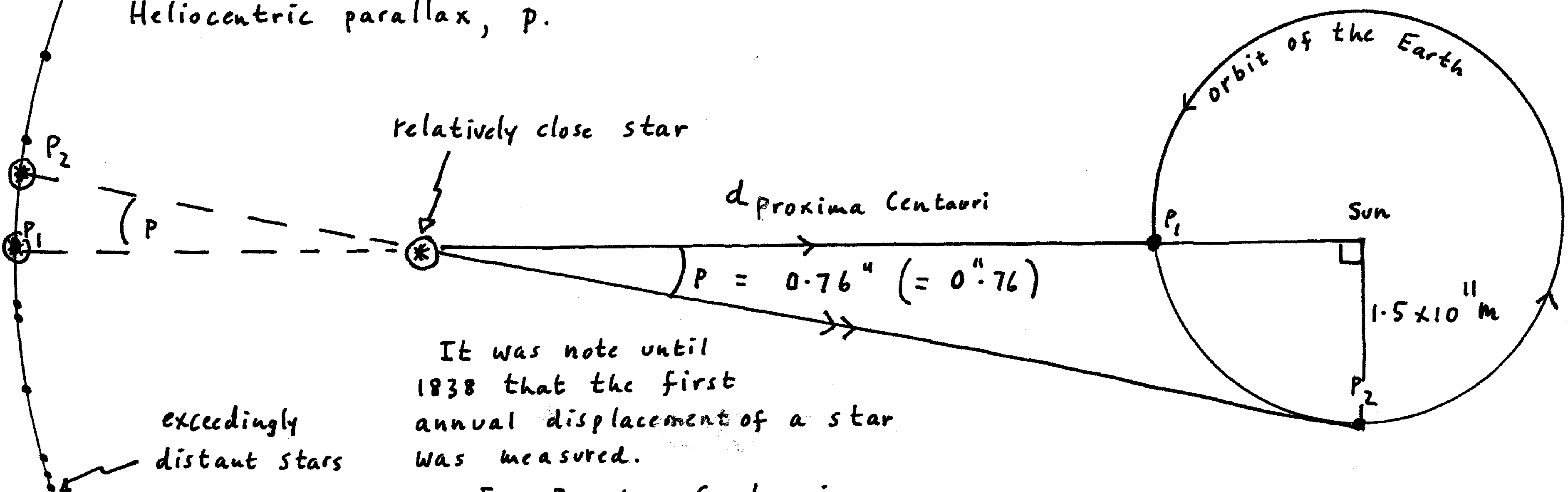
Stars are immensely distant : apart from the Sun, the nearest is almost one million Earth - Sun distances. For such large distances, a large base-line is required in order to detect a shift due to parallax. Clearly, the radius of the Earth would be hopelessly inadequate. Instead, two positions of the Earth in its orbit around the Sun are used. In fact, stellar distances are so huge, that an accuracy of one minute of arc is far from sufficient to detect any parallactic displacement: small fractions of seconds of arc are required. [Note : $60' = 1°$; $60'' = 1'$ $\therefore$ $3600'' = 1°$]

The angle subtended by the radius of the orbit of the Earth at the star is the Heliocentric parallax, p.



It was note until 1838 that the first annual displacement of a star was measured.

For Proxima Centauri,

$$\tan p = \frac{1{\cdot}5 \times 10^{11}\ \text{m}}{d_{\text{Proxima Centauri}}}$$

$$\therefore\ d_{\text{Proxima Centauri}} = \frac{1{\cdot}5 \times 10^{11}\ \text{m}}{\tan 0{\cdot}76''}$$

$$= \underline{\qquad\qquad}$$

Hint : Find $\tan 0{\cdot}76°$ and then divide by 3600, to yield $\tan 0{\cdot}76''$

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