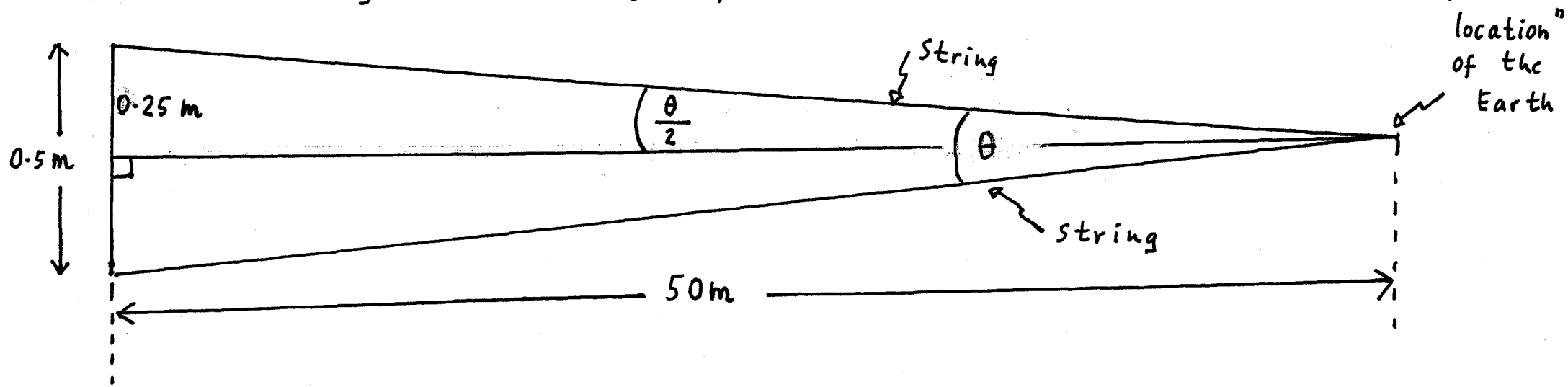
Experiment to measure the angle subtended by the Sun at the Earth, θ.

Roughly, the Solar distance from the Earth is one hundred Solar diameters. On our scale, we used a Solar disc of diameter 0·5 m and then "fixed" the Earth at 50m. String was used to represent light from the top of the sun and the bottom of the Sun. The diagram, not drawn to scale, must preserve the ratio 1 : 100. ∠θ was far too small to measure directly, so it has to be calculated using our knowledge of trigonometry.



From the above diagram,

$\tan\left(\frac{\theta}{2}\right)$

$= \frac{\text{opposite}}{\text{adjacent}}$

$= \frac{0.25\,\text{m}}{50\,\text{m}}$

$= \frac{1}{200}$

$= 0.005$

$\Rightarrow \tan\theta = 2 \times \tan\left(\frac{\theta}{2}\right)$ (*)

$= 0.01$

$\therefore \angle\theta = 0.5^\circ$

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2016, November 13

(*) For small angles, $\tan\theta \propto \theta$