

Why do closer objects seem bigger?

I am sure that you already know the answer to the question in the title. But, I wrote this article to tell you how we can quantify the apparent size of the objects. You already know how to quantify the actual size of the objects. You can use the unit of length such as kilometers, meters, centimeters, feet, inches. For the apparent size of the objects, you can use the unit of angle, such as degree. See Fig.1. You see the same sticks, but the closer stick seems bigger than the farther stick. θ_1 is bigger than θ_2 . So, angles such as θ_1 or θ_2 can tell you the apparent size of objects.

For example, the apparent sizes of the Sun and the Moon seen on the Earth are both about a half degree. Their apparent sizes are similar, despite the fact that the Sun's diameter is about 400 times bigger than the Moon's diameter. It's because the Sun is about 400 times farther away from us than the Moon is.

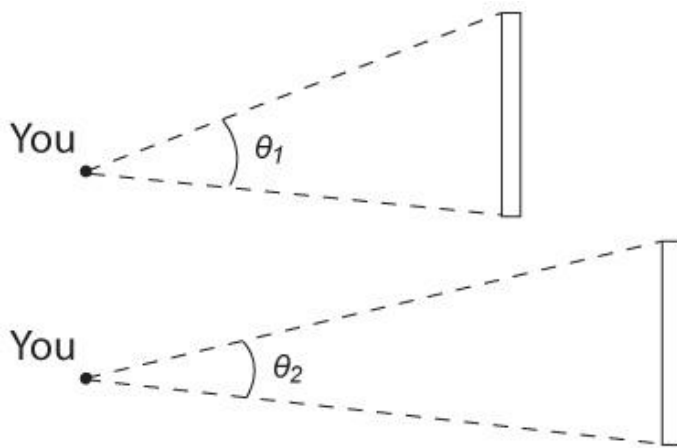


Fig. 1. The apparent sizes of a stick seen at two distances

Problem 1. Which one has a bigger apparent size? A ball with a diameter of 100 cm and 20 m away, or a ball with a diameter of 20 cm and 10 m away. (Hint¹)

Summary

- The apparent size of an object can be denoted by an angle.

¹ What should be the diameter of a ball placed 10 m away if it has the same apparent size as the ball with diameter of 100 cm and 20 m away?