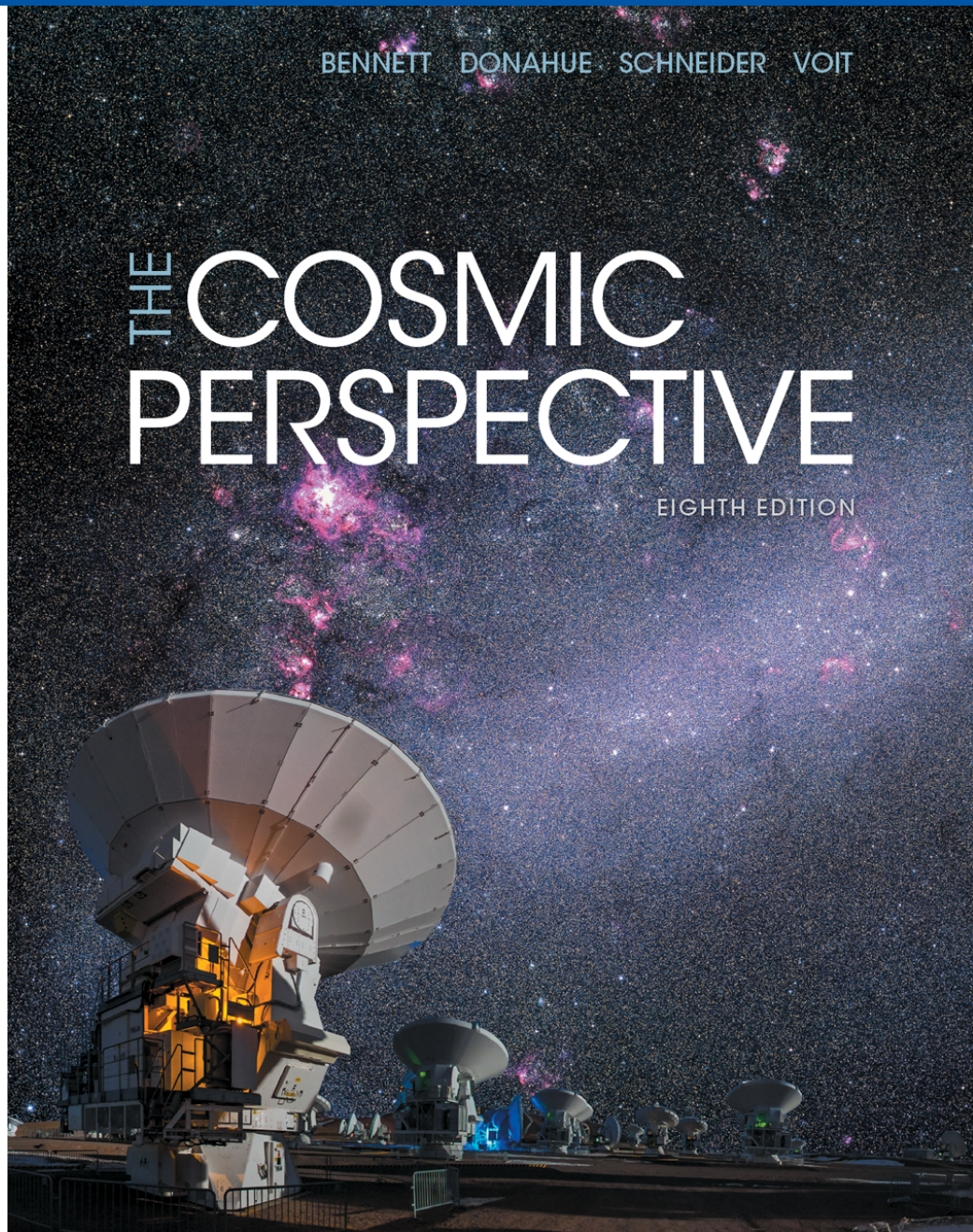
Review Clickers

Chapter 6: Telescopes: Portals of Discovery



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b) Ability for imaging, spectroscopy and time monitoring.

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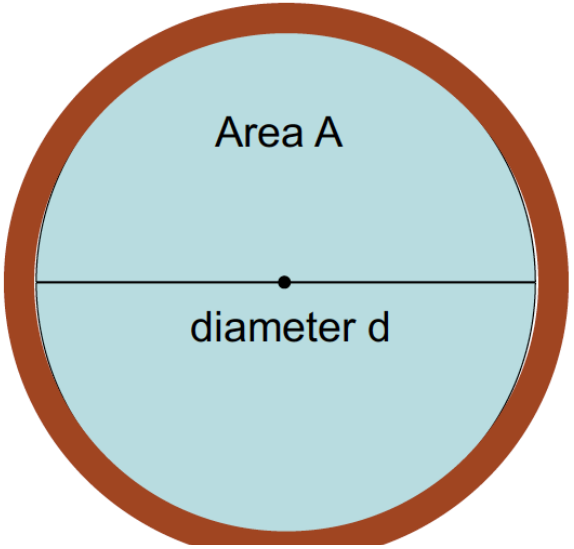
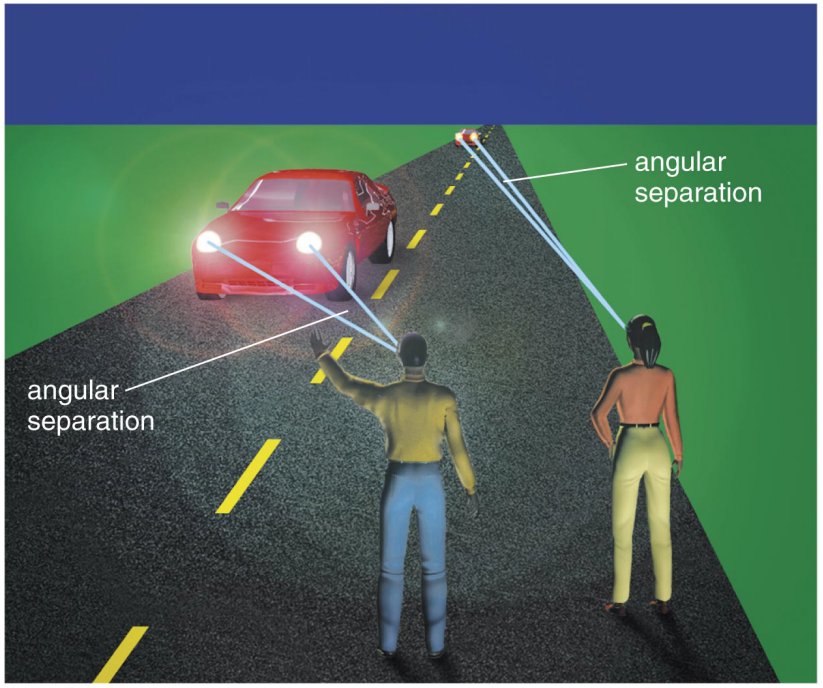


$A = \pi (d / 2)^2$

$\pi = 3.14159\ldots$



Which are the most important functions of telescopes?

a) To collect light and to have a good angular resolution.
b) Imaging, spectroscopy and time resolution.

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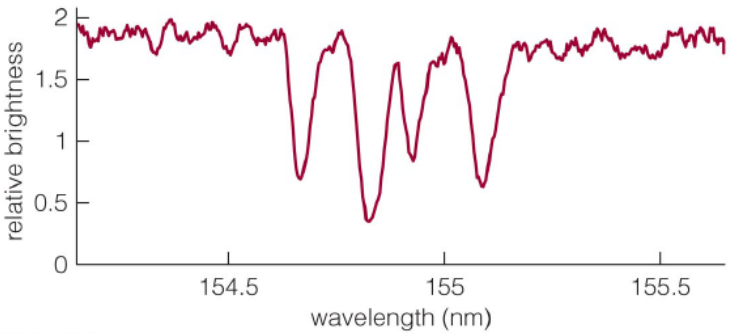
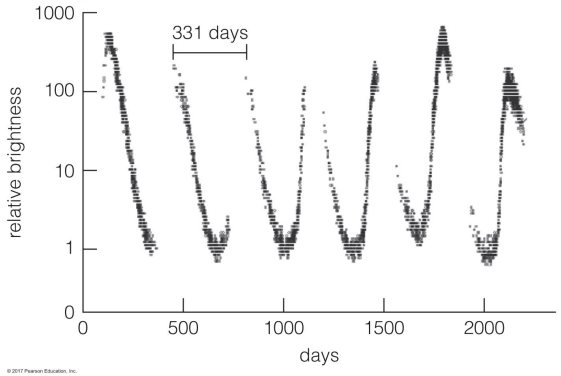


Spectrum: Intensity (relative brightness) vs. wavelength



Time monitoring: Intensity (relative brightness) vs. time

A lens forms an image in

a) a reflecting telescope.
b) a refracting telescope.
c) your eye.
d) A and C
e) B and C

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A mirror forms an image in

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a) a reflecting telescope.

b) a refracting telescope.

c) your eye.

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What are the primary reasons for making telescopes larger?

a) making things look larger
b) seeing smaller details
c) collecting more light to make faint objects look brighter
d) A and B
e) B and C

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What does *better angular resolution* mean?

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c) you can see finer details
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e) none of the above

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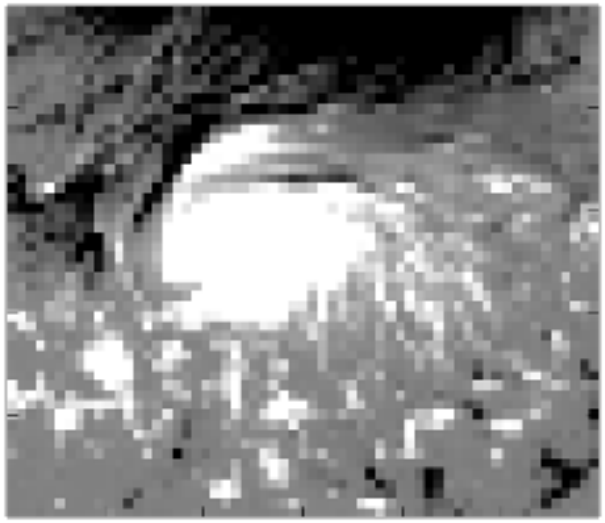
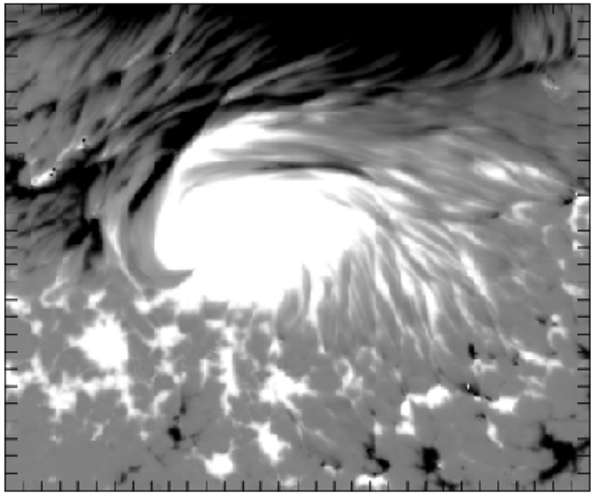


Solar magnetogram image; lower angular resolution



Same target; higher angular resolution

What advantages come from putting a telescope in space?

a) all wavelengths can be seen, even those that don't penetrate Earth's atmosphere
b) images may be sharper, without moving air to blur them
c) you are closer to the stars, for a better view
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The largest optical telescopes are designed to have

a) high magnification, large collecting area, and high angular resolution.
b) high magnification, large collecting area, and low angular resolution.
c) low magnification, large collecting area, and low angular resolution.
d) large collecting area and high angular resolution-the magnification is of secondary importance.
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Why higher magnification is not necessarily of high importance

The Andromeda galaxy

A given magnification

Higher magnification

Full view of the galaxy is lost with higher magnification

The Orion Nebula

A given magnification

Higher magnification

The image with higher magnification appears dimmer, missing some of the structure

Source: STARIZONA

New technologies will soon allow astronomers to use X-ray telescopes on Earth's surface.

a) Yes, from the highest mountain tops such as Mauna Kea, Hawaii.
b) Yes, but the resolution will be lower than from space.
c) No, X-rays cannot be focused because of the blurring effect of the atmosphere.
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Thanks to interferometry, a properly spaced set of 10-meter radio telescopes can achieve the angular resolution of a single, 100-kilometer radio telescope.

a) Yes, but with much lower sensitivity than a single, 100-kilometer telescope.

b) Yes, and the resulting interferometer will have exactly the same properties as a single, 100-kilometer telescope.

c) No, interferometry only works over much smaller distances.

d) No, the blurring effects of Earth's atmosphere limit the achievable angular resolution.

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Telescope sensitivity

Lower sensitivity

Higher sensitivity

Higher sensitivity means picking up fainter strucrure, along with background information

Source: CSIRO / ATNF & SkyServer

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b) A camera.
c) A spectrograph.

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