



Telescopes: Giant Eyes

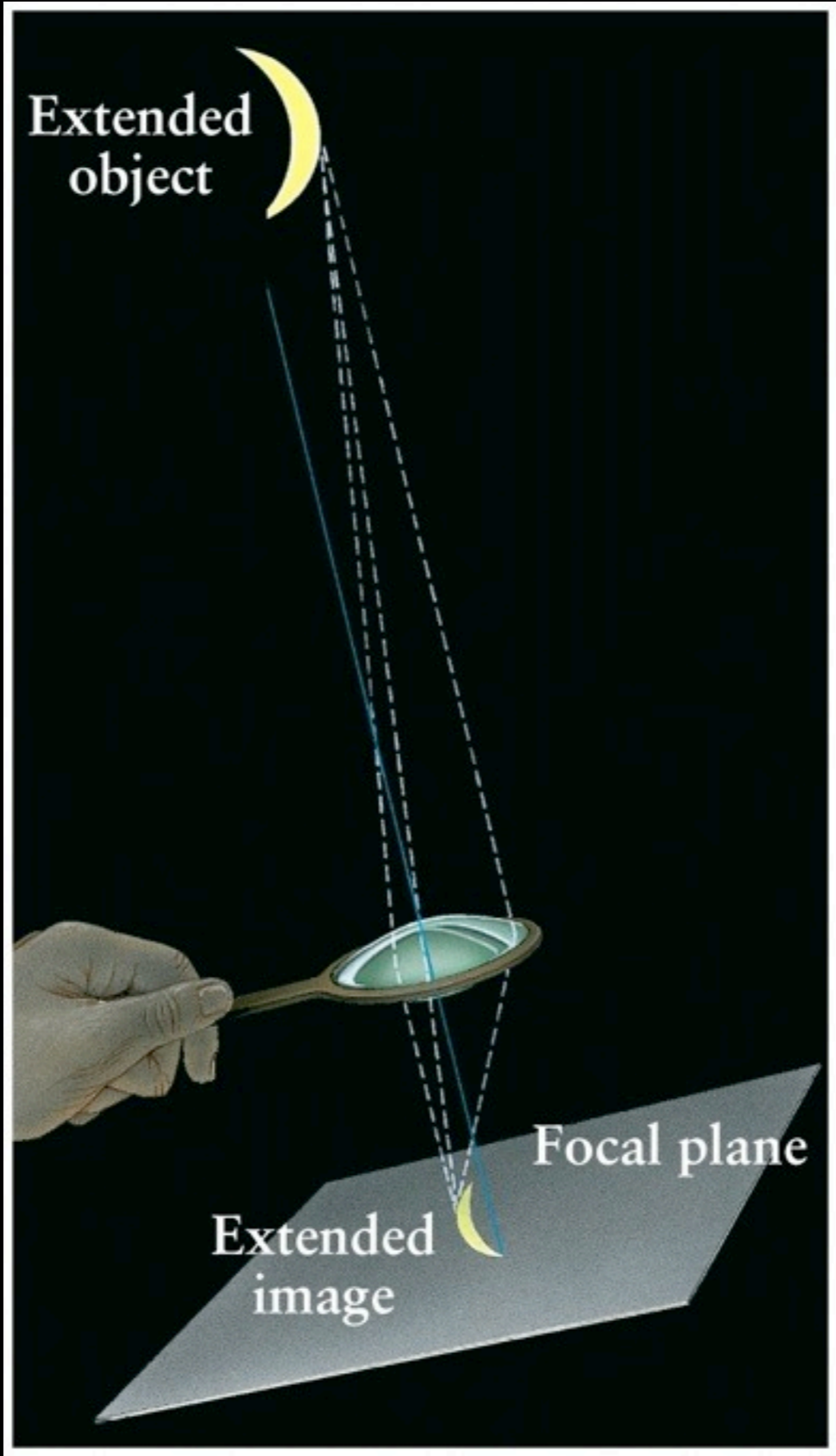
with Dr. Tony Crider

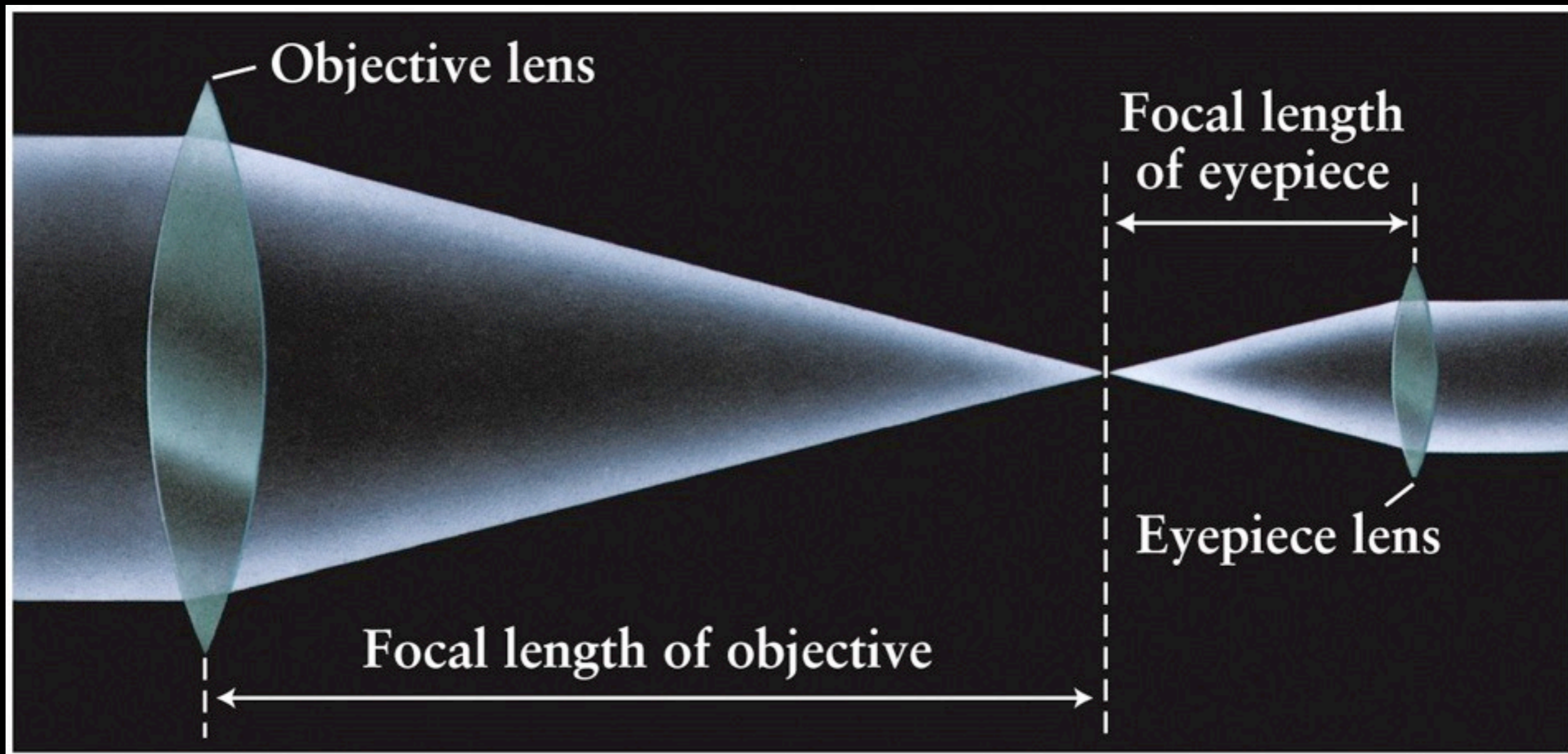
Student Learning Objectives

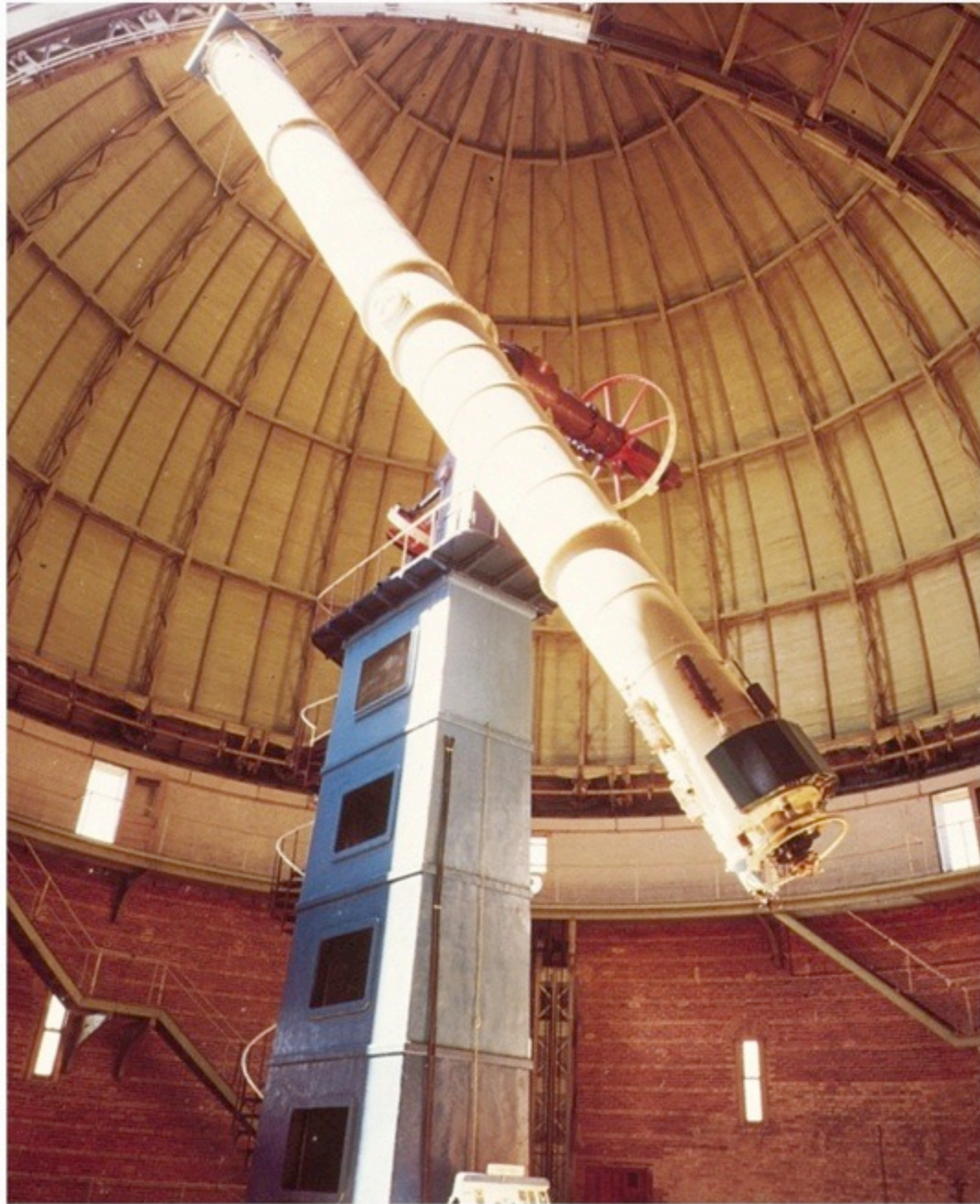
What are the main properties of telescopes?

- reflecting vs. refracting
- light-collecting abilities
- apparent magnitude and color

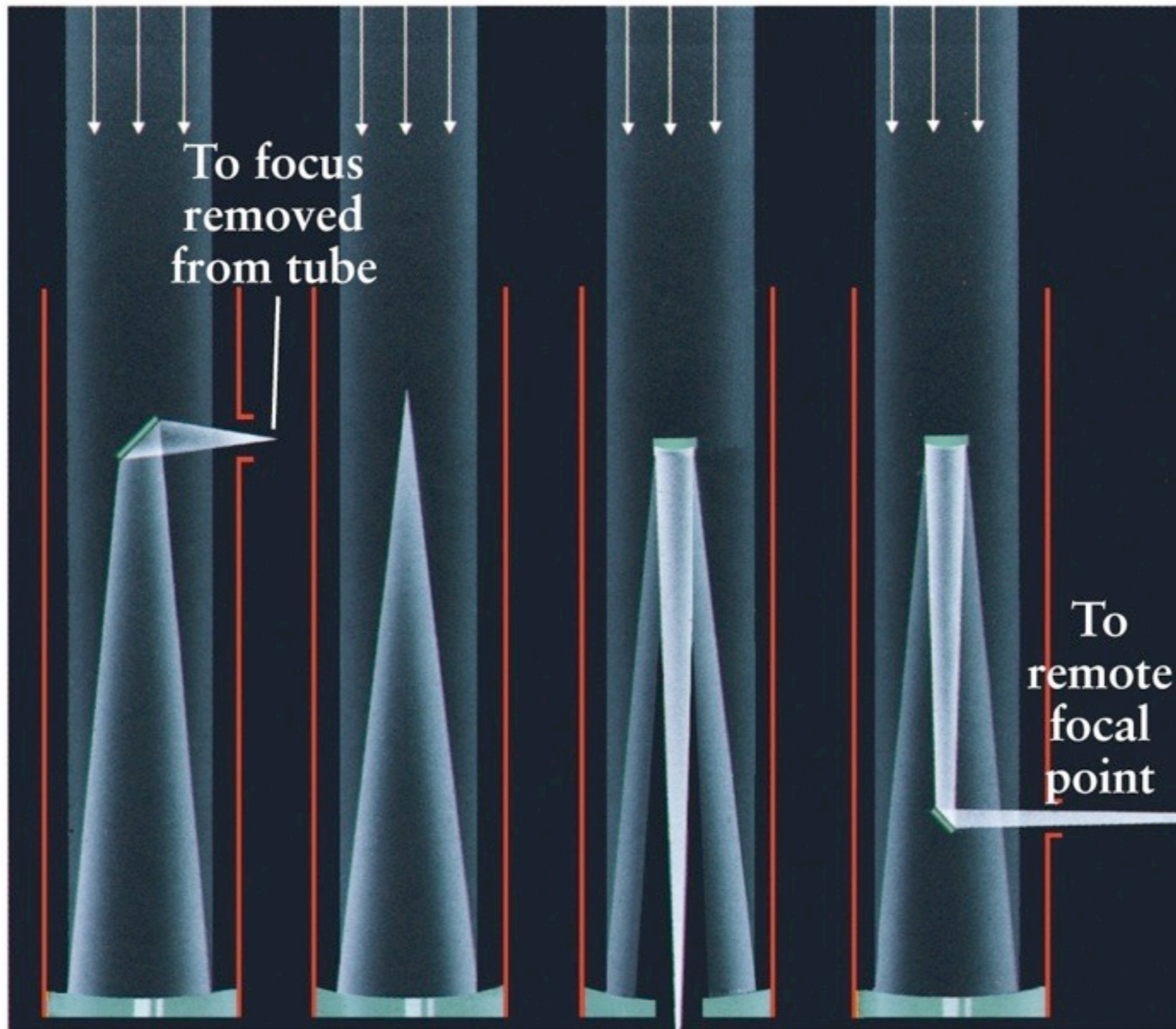
REFRACTING







a



(a) Newtonian focus

(b) Prime focus

(c) Cassegrain focus

(d) Coudé focus

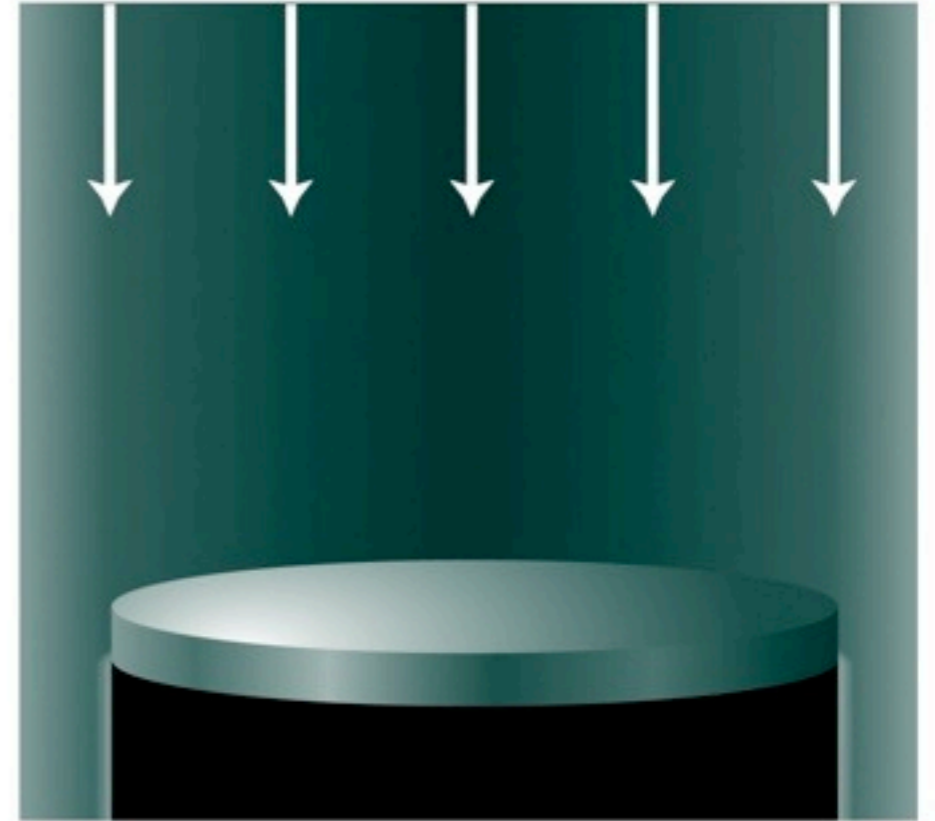
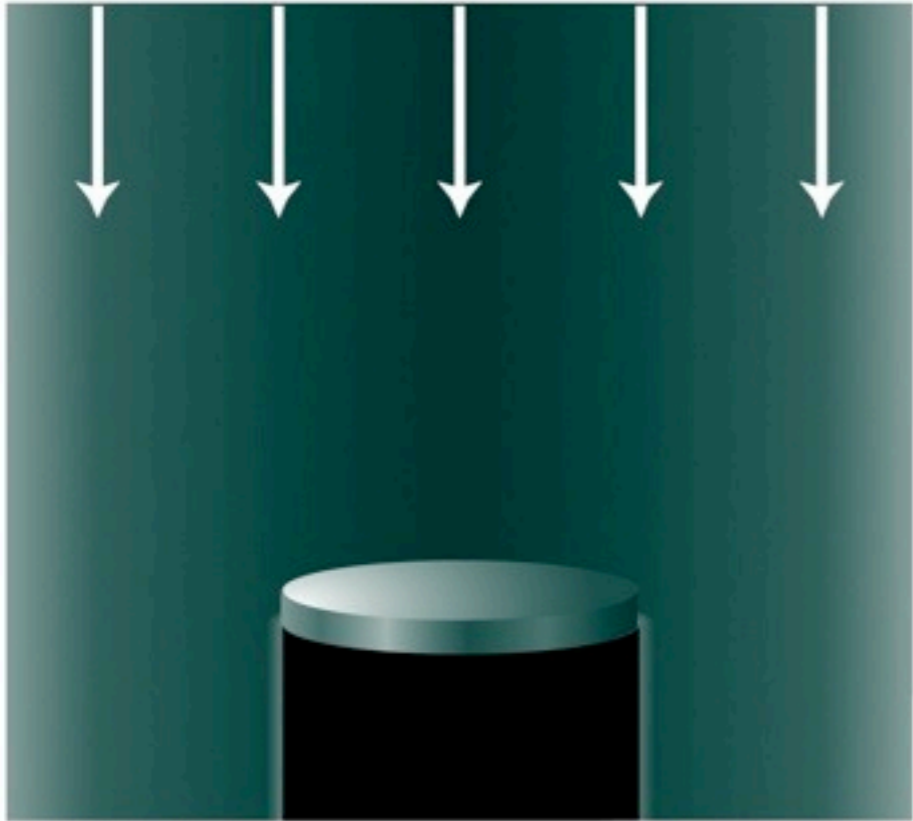
REFLECTING

Which kind is this?



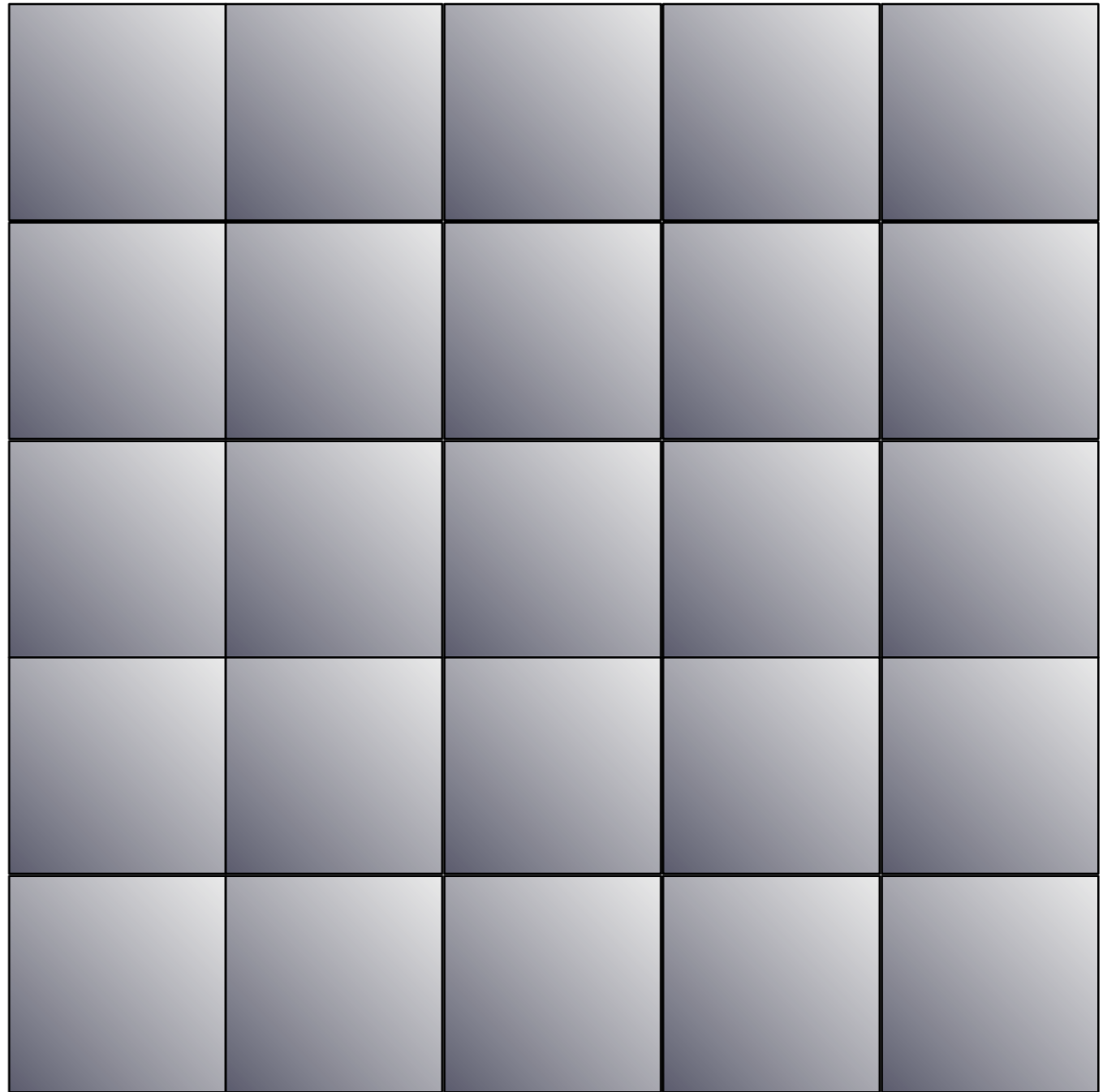
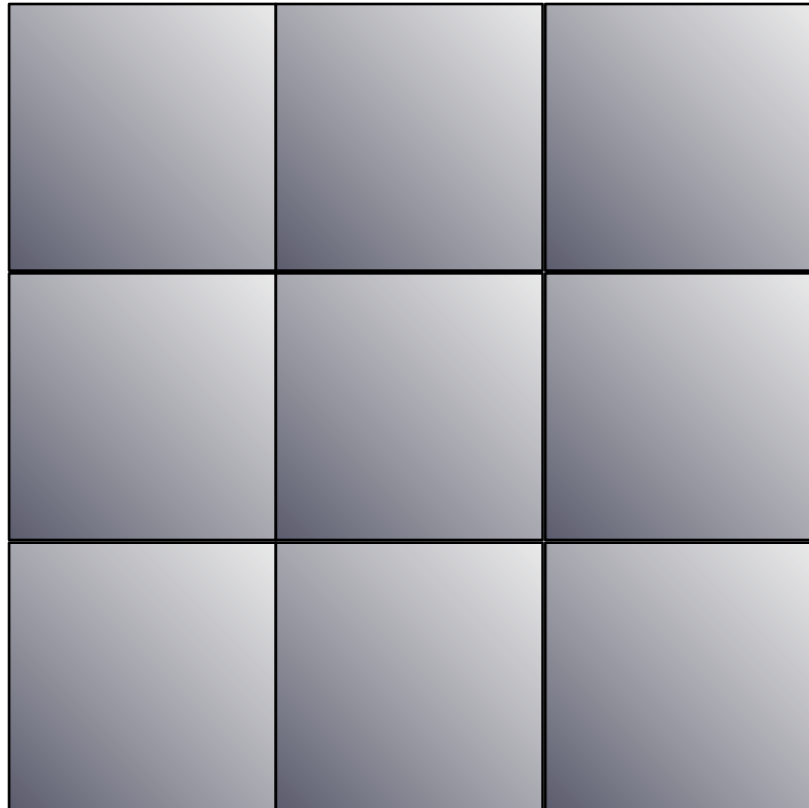
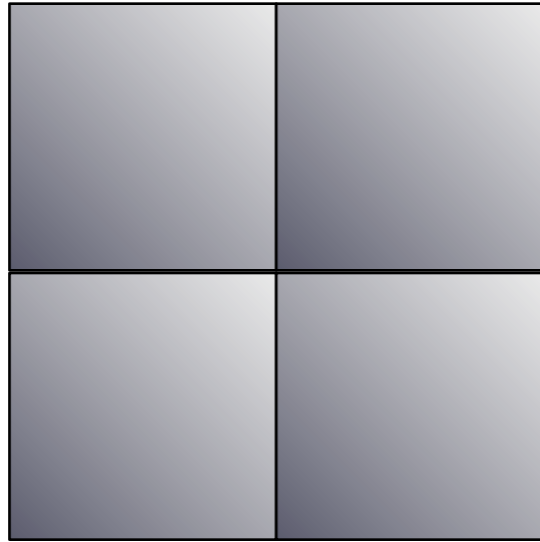
$$\text{Magnification} = \frac{\text{focal length of objective lens}}{\text{focal length of eyepiece lens}}$$

What is the magnification
of the Meade LX10?



A telescope's light-gathering power is directly proportional to its area.

$$\text{LGP} \propto \text{Area} \propto \text{Diameter}^2$$



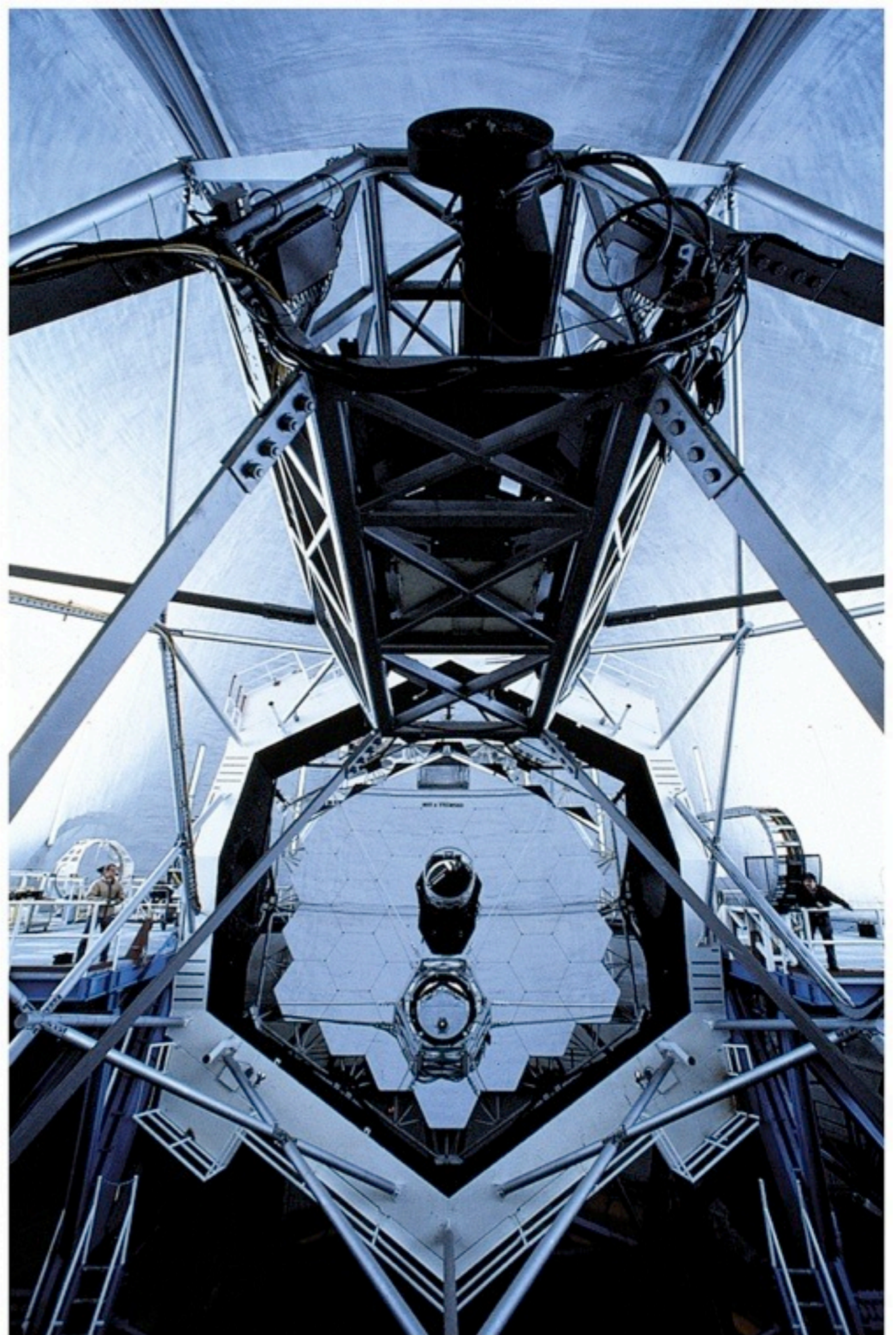
An astronomer owns a telescope with an objective lens diameter of 24 cm. She wishes to purchase a new telescope with four times the light-gathering power of her current one. What should the diameter of her new telescope's objective lens be, in cm?

How much greater is the light-collecting area of a 6-meter telescope than a 3-meter telescope?

- A two times
- B three times
- C four times
- D six times



BIG GLASS

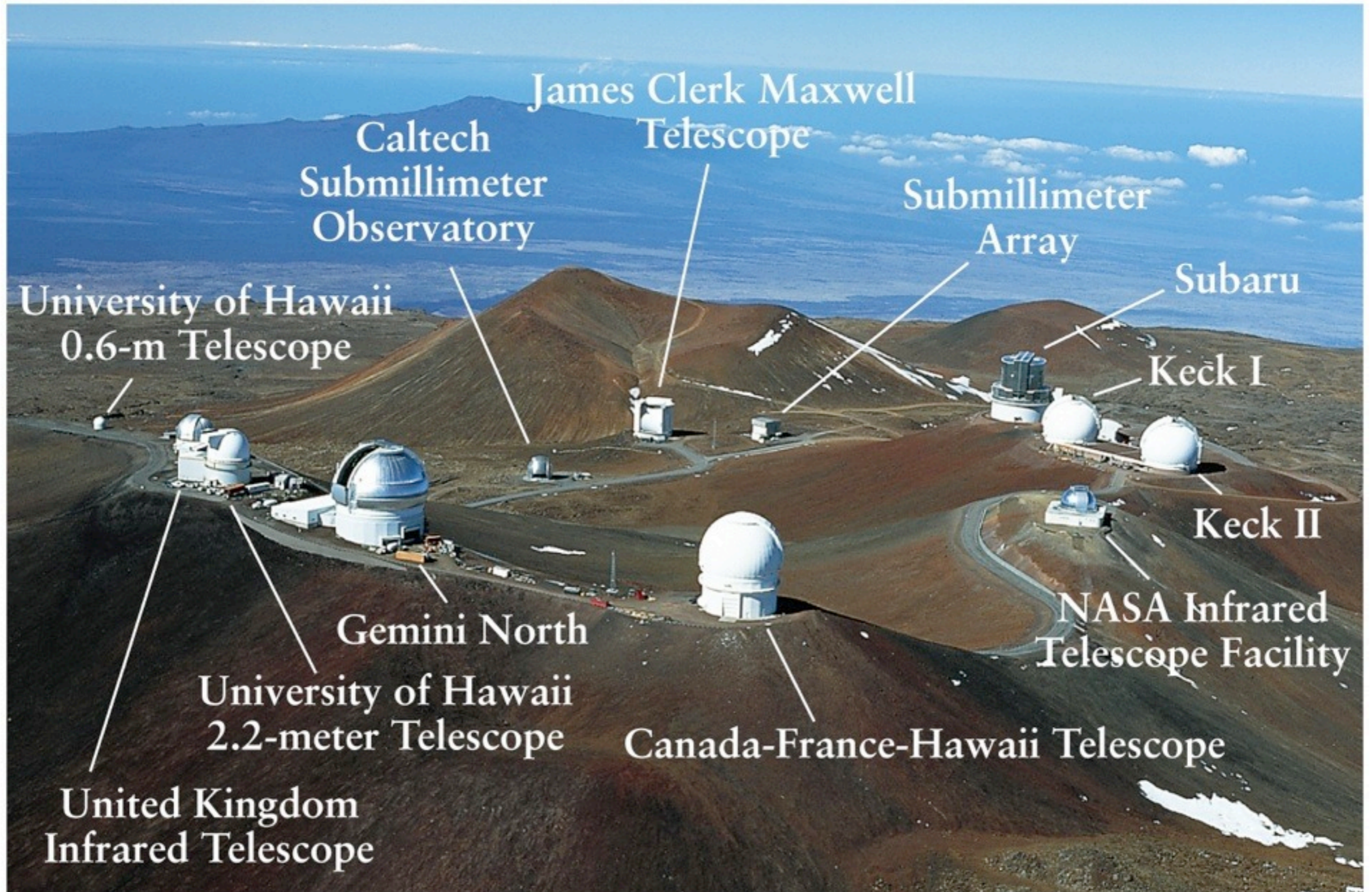


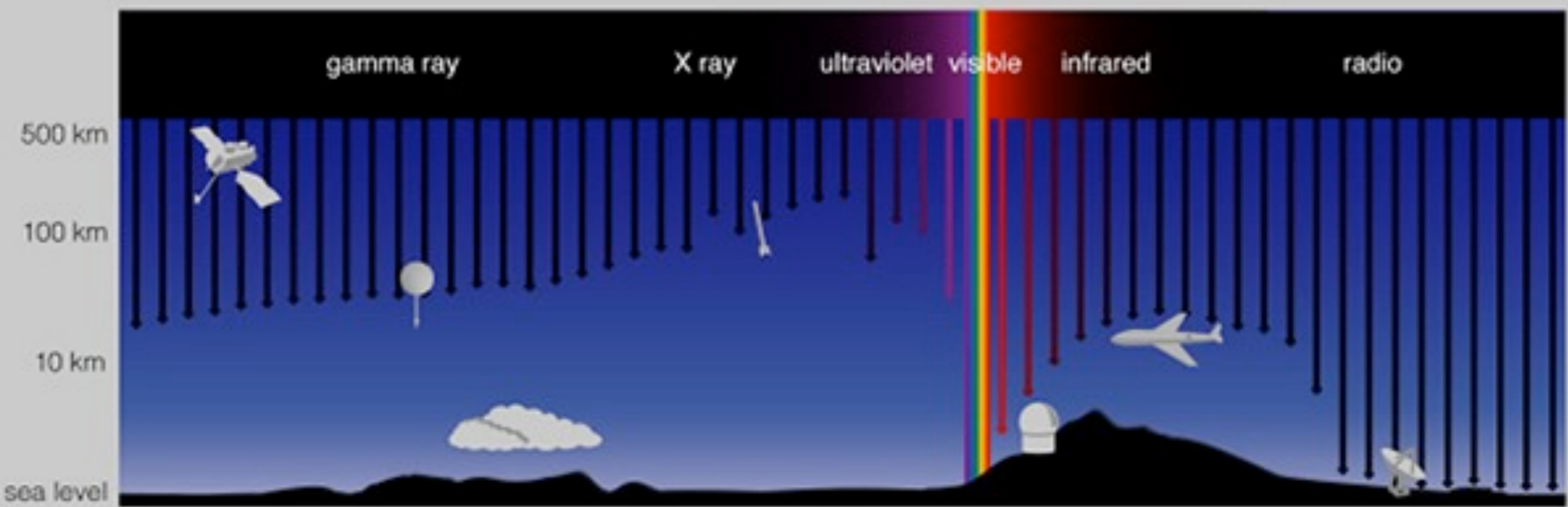
Three College Observatory



<http://www.uncg.edu/phy/tco/>

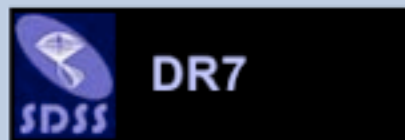
Mauna Kea Observatories





SDSS





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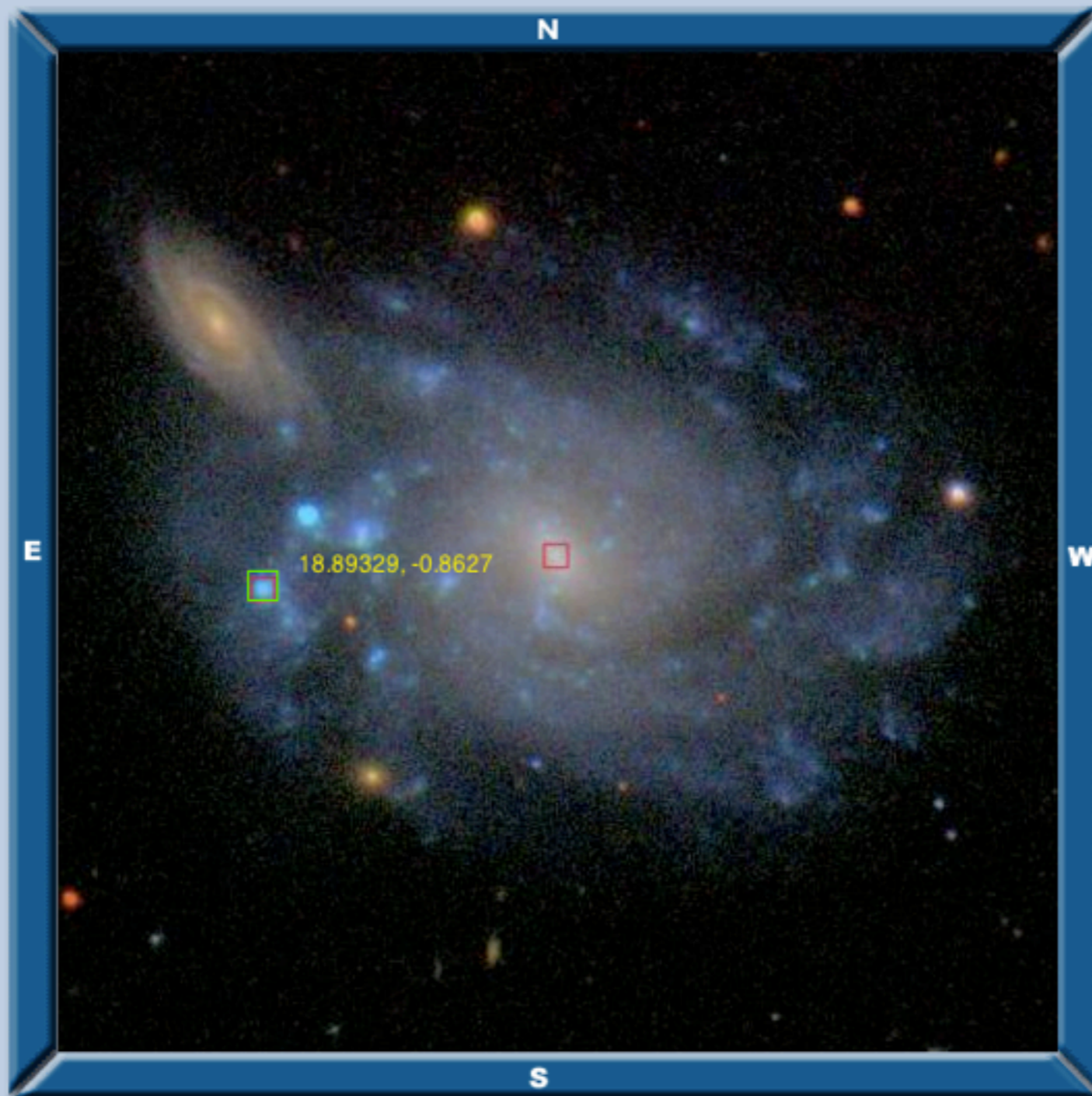
Parameters

| | | |
|-----|----------|-----|
| ra | 18.87667 | deg |
| dec | -0.86083 | deg |
| opt | S | |

[Get Image](#)


Drawing options

- Grid
 - Label
 - Photometric objects
 - Objects with spectra
 - Invert Image
- Advanced options
- Spectroscopic Targets
 - Outlines
 - Bounding Boxes
 - Fields
 - Masks
 - Plates

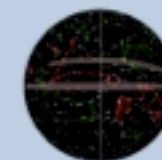


Selected object

| | |
|------|----------|
| ra | 18.89334 |
| dec | -0.86280 |
| type | GALAXY |
| u | 17.66 |
| g | 17.86 |
| r | 17.81 |
| i | 18.08 |
| z | 18.31 |



- Quick Look
- Explore
- Recenter
- Add to notes
- Show notes


[Click to open Sky Maps ?](#)

To see Sky Maps, install the latest [Flash](#) and [Shockwave](#) players.
 Sky Maps does not work in Safari. It does work in Firefox on Macintosh.

Hipparchus (130 BC)

1 = twenty brightest stars

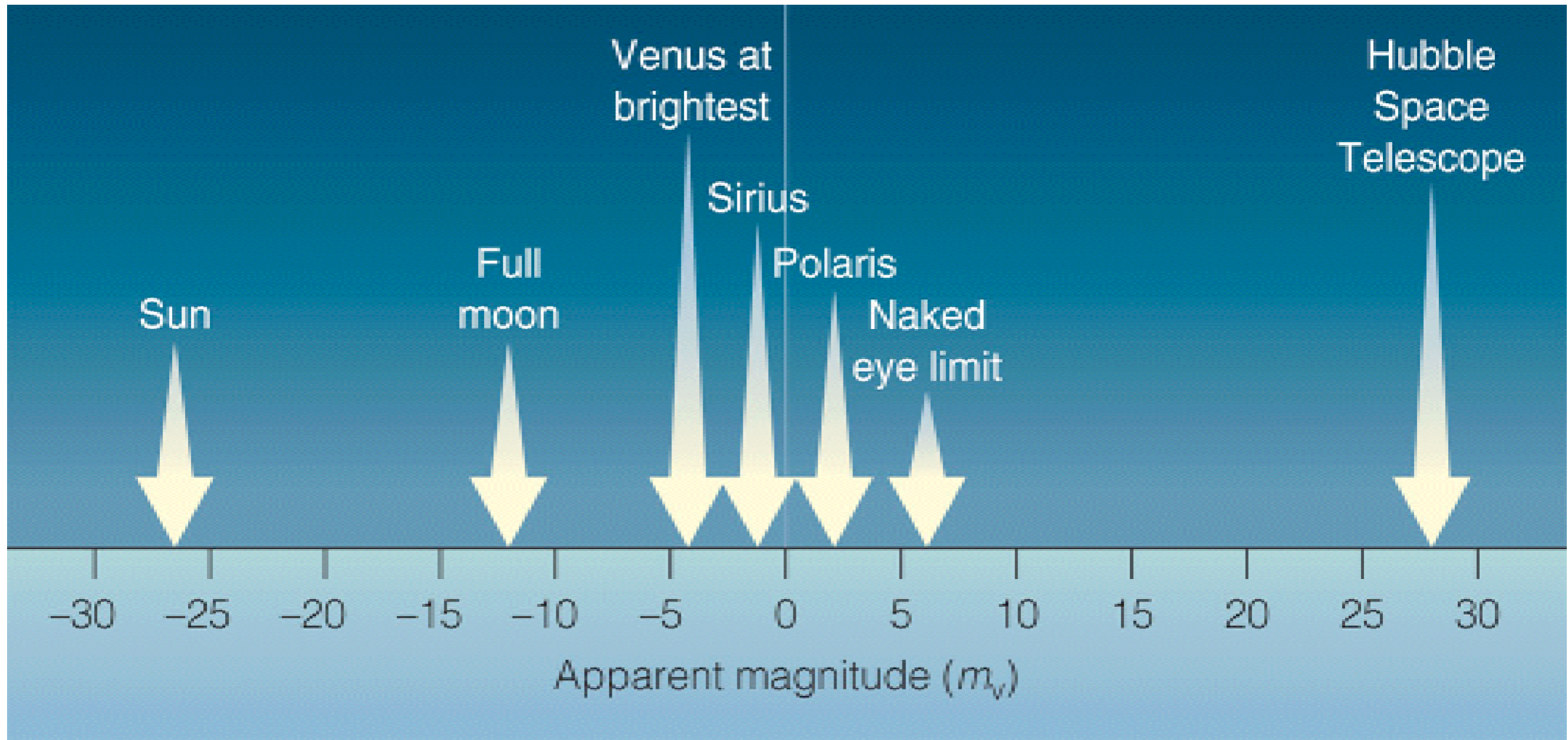
2

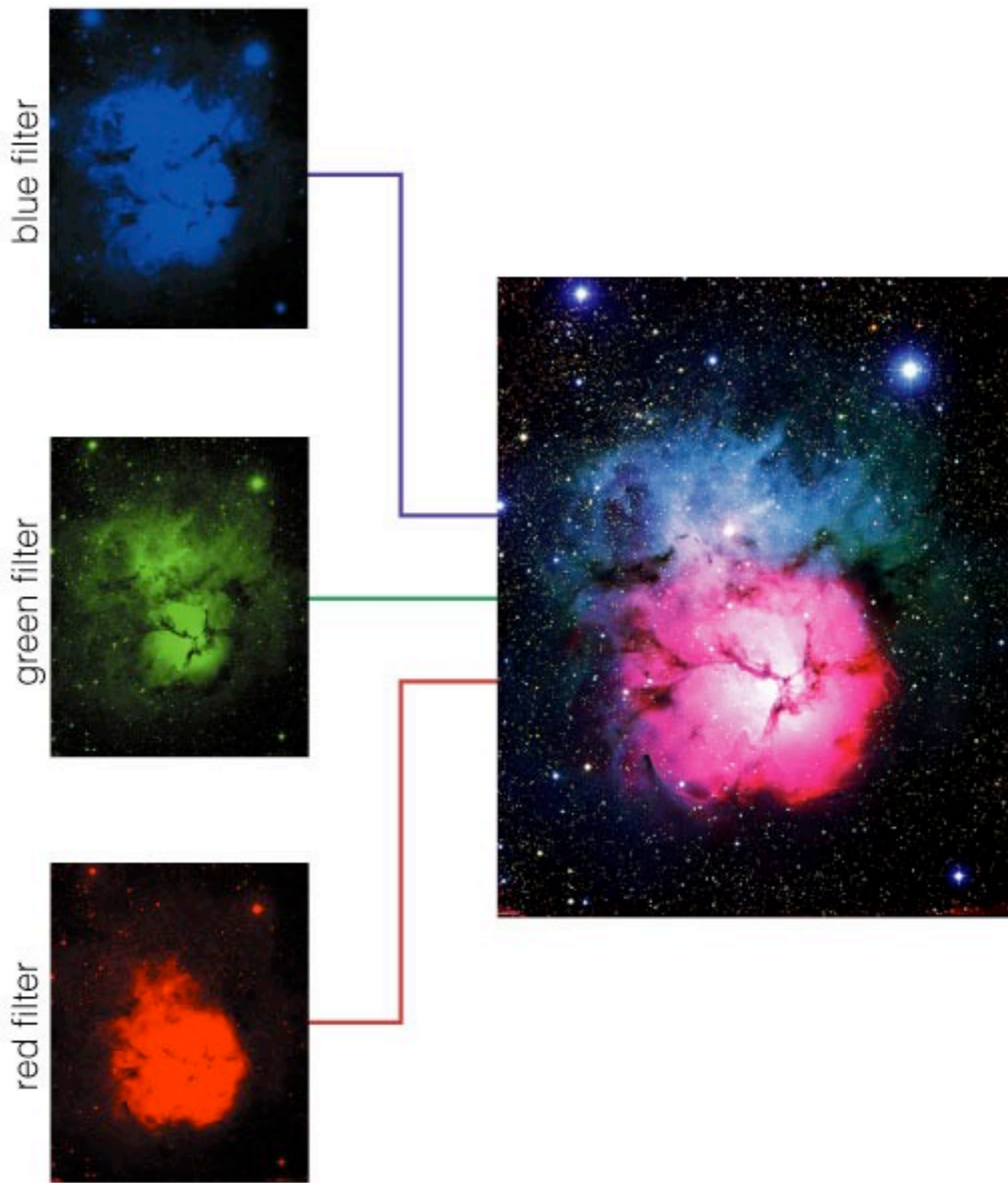
3

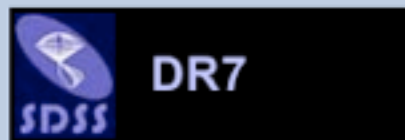
4

5

6 = faintest stars







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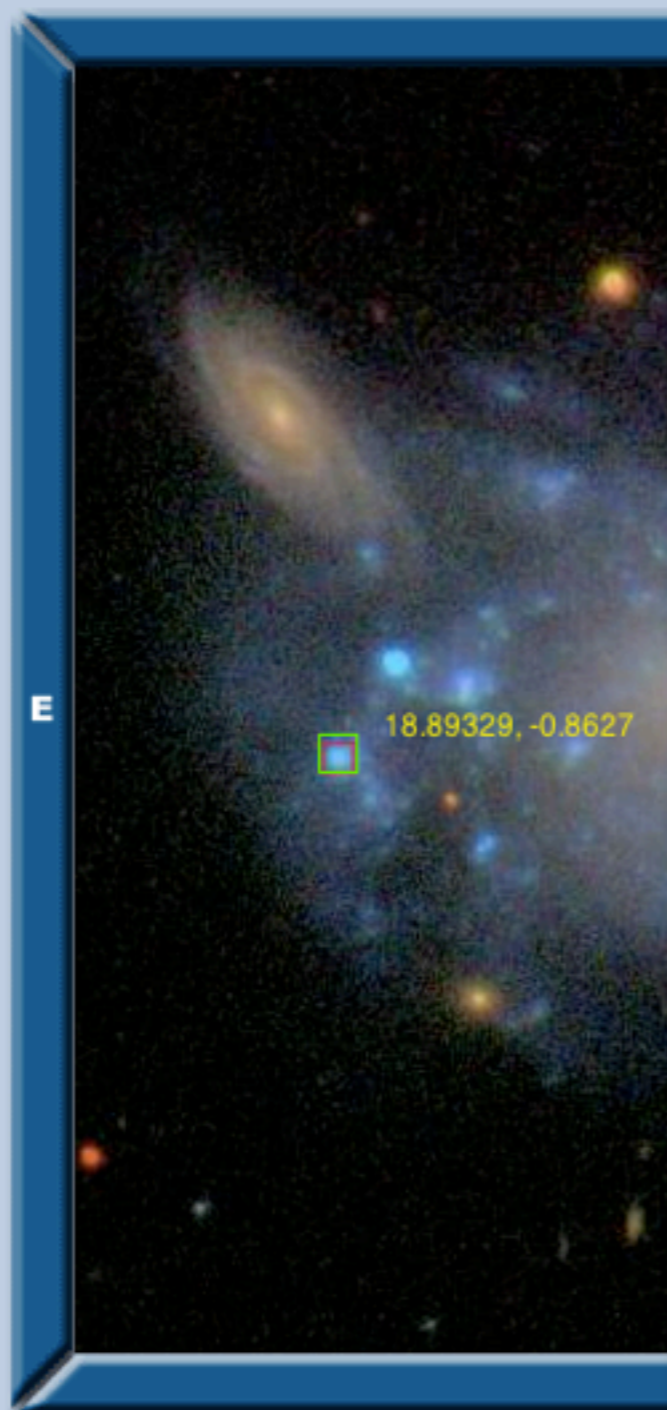
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[Get Image](#)


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Selected object

Selected object

```

ra      18.89334
dec     -0.86280
type    GALAXY
u       17.66
g       17.86
r       17.81
i       18.08
z       18.31
  
```

9334
 8280
 GALAXY
 7.66
 7.86
 7.81
 8.08
 8.31



ok

tes

es



Sky Maps ?

s, install the
[Shockwave](#)

not work in
 work in Firefox

SDSS Scavenger Hunt

Use the Sloan Digital Sky Survey to find the following objects. For all objects, you will need to report the RA, DEC, and TYPE. For some object, you may also need to report the colors. Put commas between all answers in a field.

<http://cas.sdss.org/dr7/en/proj/basic/>

* Required

Student Names *
Sam Malone, Diane Chambers, Norm Peterson, Cliff Claven

Student Datatel Numbers *
1234567, 1357911, 1248163, 1357111

1 - A star with $15 < g < 18$
ra, dec, type, g

2 - A very bright star with $g < 12$
ra, dec, type, g

3 - A face on spiral galaxy

Student Learning Objectives

What are the main properties of telescopes?

- reflecting vs. refracting
- light-collecting abilities
- angular resolution



ELON
UNIVERSITY
PHYSICS DEPARTMENT



Exam Review