

Arvind Borde

# AST 9: Homework 4b

1. Which of the ground-based telescopes that we discussed in class might not have its observations affected by the earth's rotation?

2. How smooth does the surface of the Arecibo telescope seem compared to the surface of the Subaru? (See class notes for pictures.) If the smoothnesses seem different, why might it be OK to have different degrees of smoothness in the two cases? For a radio telescope that's distinctly not smooth, see the picture on the right of a radio telescope at Stanford University. Why might it work as a reflector?



3. If a telescope with focal length 30 cm "sees" an object taking up  $2^\circ$  of its view, how big is the image in the telescope?

4. If an object makes an image that's 0.5 mm on your retina, how many degrees of your view does it occupy?

5. When you zoom into an object optically with your camera (not electronic zoom), does the lens extend or contract? Why?

6. Why is a ground-based x-ray telescope not a great idea?

7. What is the resolution in seconds of a telescope with a 0.5 m diameter lens at visible light?

8. We've seen in class that some telescopes are dual-purpose: they detect visible light and infra-red. Were the telescope in the question above capable of this, would it have higher resolution in infra-red or lower (compared to visible light)?

9. What diameter lens do you need on a telescope that can resolve up to a thousandth of a second?