U6772166 Yuxuan Yuan ASTR 2013 Worksheet

<1> Siding Spring Observatory.

1.

(1) Clear weather

(2) Low level of atmospheric turbulence

(3) Freedom from artificial light to ibserve distant object.

2.

SSO sits high upon an ancient volcano on the edge of the warrumbungle national park, which provide astronomers with the best conditions to see deep into space. SSO provide the best place in Australia to match the conditions of observing described in Q1. Particularly, there is almost no light pollution in SSO, making it one of the darkest observing sites in the world.

3.

There are 11 telescopes in active use at SSO.

The Siding Spring Observatory is located on Mount Woorut (at a height of 1165m)

<2> The ANU 2.3m telescope

4. The central telescope pier is independent from the surrounding building structure in order to avoid the transmission of external vibrations to the telescope.

5.

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6.

At the control room.

7.

Go outside of the control room through emergency door, and go to the stairs which is in the outside, and then go to the ground.

8.

Because HST is locate in the outer space. Its observation will not be affected by atmosphere and has no sky background random noise contamination, so it is able to detect very faint objects against a truly black background. That is why HST can see fainter things than can the ground-based telescopes.

9.

In the visible band and infrared astronomy, the sky background is strong and the SNR of HST and ground base telescope will be significantly different. However, in ultra violet regime, the SNR of these two telescope is quite similar.

10.

They are 2.3m, f/2.05 primary mirror, 0.3m, f/7.85 secondary for Nasmyth and 0.3m, f/7.85 tip-tilt secondary for Cassegrain. The first and second focal station is used and the third is unused.

<3> The Anglo Australia telescope

11.

Echelle Spectrograph (UCLES) which is used for high-resolution optical spectroscopy

12.

The AAOmega spectrograph and The Two Degree Field system ("2dF")

13.

(1) No cloud, less wind

(2) its ability to allow the instrument attached to it to stay fixed on any object.

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The AAOmega spectrograph can cover a 2 degree field. And its spectrograph can cover the full wavelength range, 370nm to 850nm, or 470nm to 950nm using a redder dichroic.

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Cylinder. It is optimised for simultaneously observe hundreds of galaxies and stars. And it has also been used to carry out several important southern sky surveys, including the [2-degree-field Galaxy Redshift Survey](http://www.mso.anu.edu.au/2dFGRS/) (2dfGRS), and plays an important role in the search for planets around other stars.

16

The volume and structure of AAT is not optimised for observing.

The location of the telescope in Chile is better than the AAT, which is higher and less water vapor.

<4> SkyMapper Telescope.

17.

(1) Creating a comprehensive census of the stars in our galaxy and uncover the first quasars and stars to form in the universe.

(2) Map the invisible material known as dark matter, using samples of very rare stars uncovered in the survey.

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Vibration of the telescope

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This problem is the same as 18

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SkyMapper is a 1.3m telescope featuring a 5.7 square degree field-of-view Cassegrain imager. Since the performance is A \Omega. Since they have equal telescope area. The ZTF is 8 times better.

<5> Las Cumbres Observatory

21.

Scientist using LCO study many different objects that rapidly change in the sky.

<6> UK Schmidt Telescope

22.

(1) The UKST has a 1.8m diameter primary mirror and a 1.2m corrector lens which gives it a huge field of view.

(2) The UKST was designed to photograph 6.6\*6.6 degree areas of the night sky on glass plates 356\*356 mm square in order to make photographic images of the night sky. Also the robotic fibre positioner system 6dF can measure up to 150 objects in a single field-of-view simultaneously.

23.

It measure accurate star velocities and physical characteristic for about half a million stars in our galaxy. The UKST has a huge field of view, which is designed to photograph 6.6\*6.6 degree areas of the night sky. The new robotic fibre positioner system called 6dF is able to measure the spectra of up to 150 objects in a single field of view simultaneously.

<7> The Parkes Radio Telescope

24

This problem was solved by the incorporation of a "Master Equatorial" (or ME) telescope. The ME is situated at the intersection of the Azimuth and Zenith axes and is mounted on a cylindrical column within the tower structure which is physically isolated from the tower. This has the added advantage that any movement in the tower structure which supports the dish does not affect the telescope system pointing. The ME tracks the object across the sky, and the dish follows by minimising the misalignment between it and the telescope by means of an Error Detector System.

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Maiximum pixels that Parkes can use to create an image: 1

New ultra wideband receiver have 19 pixels

26

The inner smooth plated surface was upgraded in 1975 which provided focusing capability for centimetre and millimetre length microwaves. The telescope operates at frequencies from 440 MHz to 23 GHz which corresponds to radiowaves of 75 cm to 7 mm. For any radiowave to be reflected form the dish it must be smoother than a fraction of the wavelength. For the Parkes telescope the dish surface is accurate to within 1-2 mm of the best-fit parabola, allowing 7 mm radiowaves to be reflected