

Smiley Basics

2.1 Introduction to Smiley



Podcast: 2.1 : Smiley Basics

The Podcast is **4:58** min in length.

P

Presentation Slide 2.1



Student Guide: P.2

Q

Quiz 2.1

SMILEY

1. "Smiley" is a **4.6m** radio telescope located at the **Pisgah Astronomical Research Institute**, or PARI.
2. Smiley is remotely accessed via the internet to be used by teachers and students to introduce them to **Radio** Astronomy.
3. Smiley is a real working radio telescope and not a simulation.
4. After training students will be able access and utilize a real working radio telescope to conduct real world scientific investigations.

RADIO TELESCOPE OPERATIONAL BASICS

5. A **telescope** is any device that makes an object look **bigger** than it is.
6. Most are familiar with **optical** telescopes, which view the **visible** spectrum.
7. Radio telescopes do the same as optical except they “look” at the radio spectrum.
8. Radio telescopes are **Astronomers** “ears to the sky”.
9. Smiley scoops up **radio** waves in a dish looking telescope.
10. Radio telescopes catch radio waves in a dish looking antenna called a **reflector**.
11. The reflector sends the signals up into the center of the dish called the **focal** point.
12. The feed is comprised of a horn.
13. The horn feeds the incoming signals to a sensitive radio **receiver** and amplifier.

14. Lastly, the signals are sent to a computer for conversion from analog to digital data.

RADIO TELESCOPE SPECS.

15. Hydrogen is the first element on the periodic table. It contains one positively charged proton and one negatively charged electron.

16. Normally the electron spins in the opposite direction in relation to the proton.

17. When a hydrogen atom is hit by another atom, or an electron, the hydrogen's electron is forced to flip into the same direction as the proton.

18. Since the proton is positively charged and the electron is negative, they repel each other causing the electron to flip back into spinning into the opposite direction.

19. When the electrons flip back energy is released in the form of a photon.

20. The photon has a wavelength of 21cm or a frequency of 1.42 GHz.

21. This Flip –Spin action identifies the presence of hydrogen.

22. Smiley collects the emissions from neutral hydrogen to locate and study hydrogen.

23. Since Hydrogen is the most abundant element, studying it gives us better insight into the Universe.

DATA ANALYSIS

24. Data from Smiley is processed by a computer to be analyzed by three types of scanning.

25. Spectrum Scanning measures the intensity of a radio emission's frequency.

26. Continuum Scanning measures the intensity of radio emissions over time.

27. Mapping Scanning Collects the intensity of an emission over an area to generate a Map image of the source

Proceed to 2.2