AMATUER RADIO TELESCOPE

1. A radio telescope is an astronomical instrument consisting of a radio receiver and an antenna system that is used to detect radio-frequency radiation emitted by extraterrestrial sources.
2. Resolving Power = Wavelength/Diameter.
Thus radio telescopes are larger than optical to achieve resolution.
3. Different types of antenna are used to catch radio wavelengths. some are discussed below:



Parabolic Dish

Most famous type of antenna
1. Parabolic reflector and a feed
2. large dish = good signal
3. Costly and difficult to handle

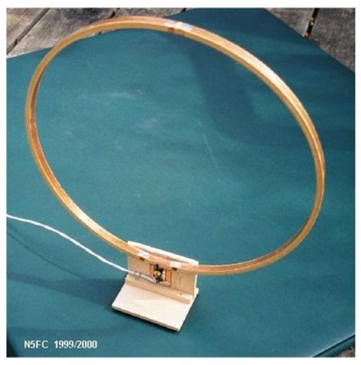
Yagi Antenna

Aluminium rod dipole & reflector
1. Looks in particular direction
2. Amplification is OK
2. At 2.7 GHz, antenna too small



Loop antenna

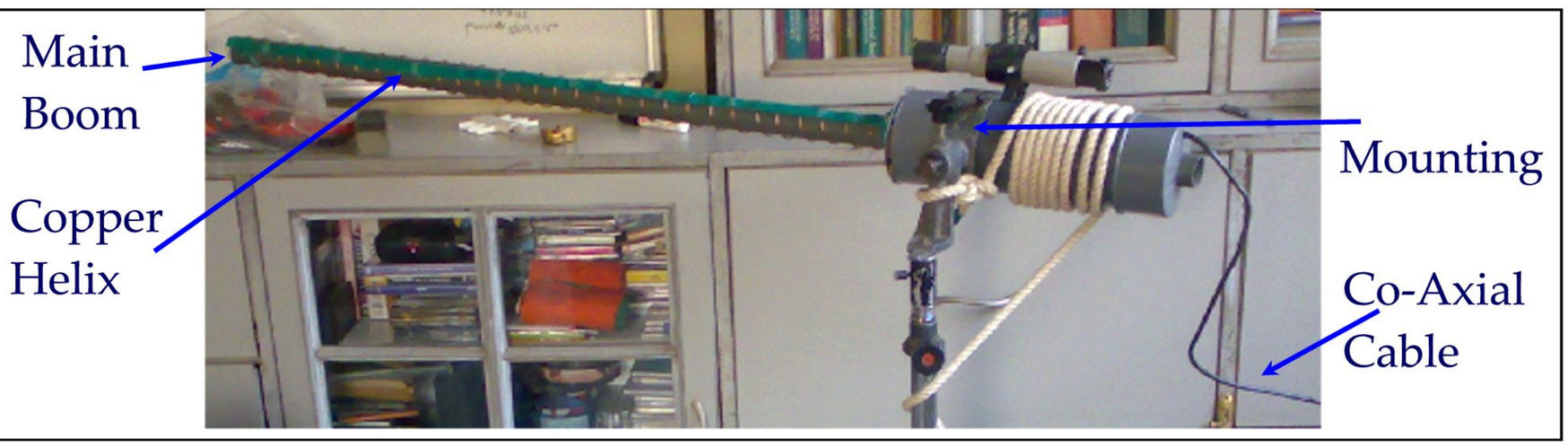
Compact and easy-to-make.
1. Circumference = wavelength.
2. Directionality and gain average.
3. Precise measurements impossible.



Helical antenna

Equivalent to many loops placed together.
1. No. of turns determines the gain.
2. Gain and directionality better than loop.
3. Easy to make and handle.

Antenna parameters



Wavelength= 11.11cm
No. of turns= 32
Gain ratio= 203
Beam width= 14 degrees
Bandwidth= 40 MHz

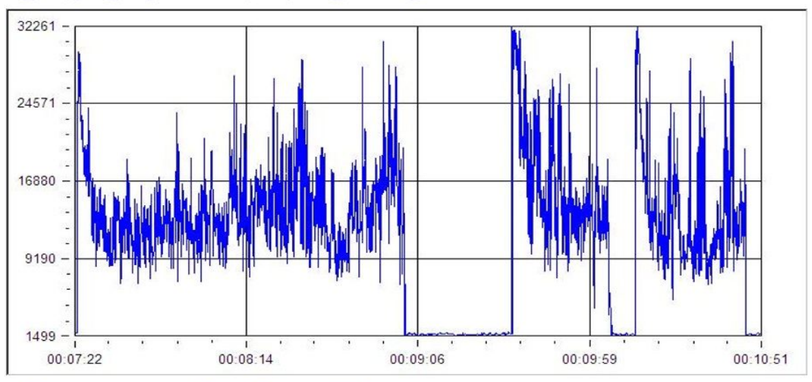
Receiver:

Receiver used was Tata Sky STB. Antenna was connected directly to the receiver.
1. Gain around 80 dB.
2. Receives signals of 2.7 GHz and converts to audio
3. Audio output given to the sound card of laptop.

Digital Signal Processing.

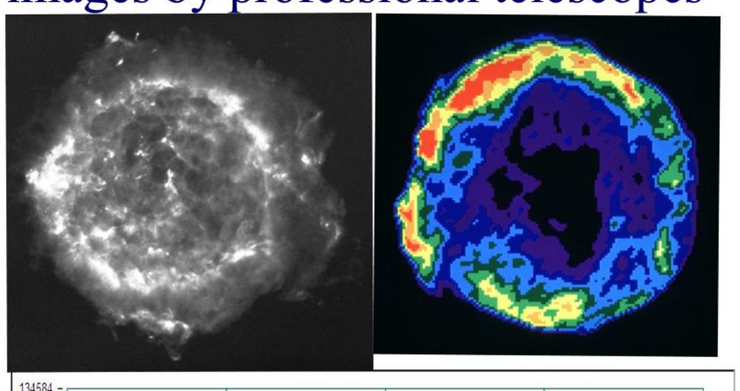
1. Audio input taken from the receiver.
2. Radio SkpPipe II was used to analyse the signals.
3. Software plots graphs of Power v/s Time.

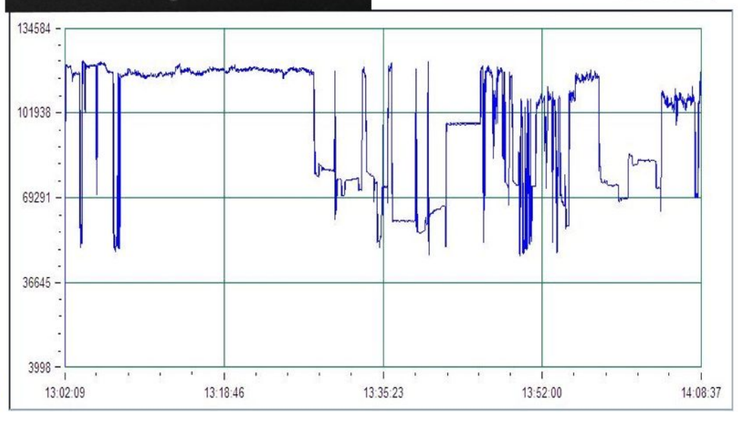
Observations



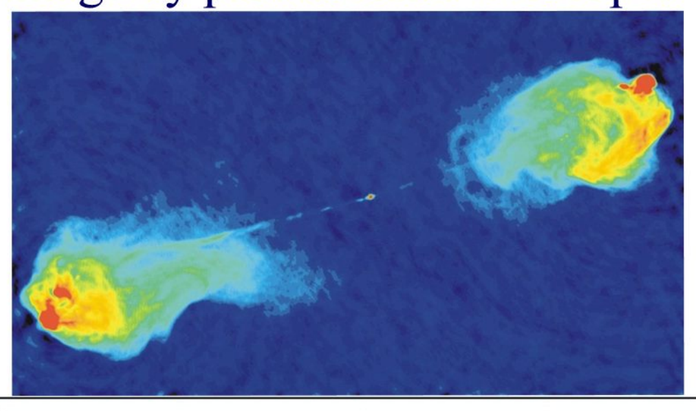
Strong Solar Flares

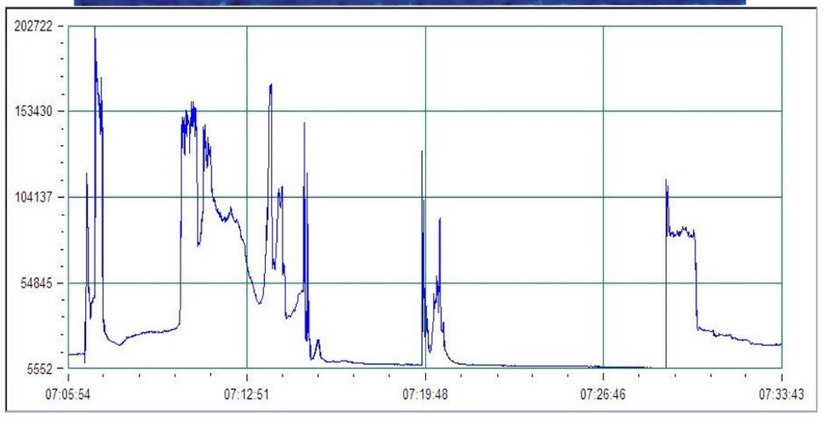
Cassiopea A followed by Tycho (both SNR's) Compare with radio images by professional telescopes





Compare Cygnus A with radio image by professional telescopes





Benefits
1. Cheap (<Rs.10,000)
2. Easy to make & use

Drawbacks
1. Poor Sensitivity & Beamwidth
2. Tracking for spectra not possible

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