

Track Down Interference

activity

Radio astronomers study the radio waves coming from faraway cosmic objects such as comets, exploding stars, and black holes. These signals are faint and difficult to collect from such distant sources. All our modern devices add to the challenge. Electronic games, remote-control toys, cell phones, digital cameras, and vehicles all churn out signals that radio telescopes pick up. Human-created radio waves like these are called radio frequency interference or RFI. Similar to how nighttime lit-up cities create light pollution for optical telescopes, RFI is signal pollution for radio telescopes. Radio astronomy observatories must quiet the skies near them by limiting the electronics in the area.

Are the skies around you quiet enough for a radio telescope? Or is there too much RFI clogging up the airways? Find out by making and using your own RFI detector.

YOU'LL NEED

- Small AA battery
- Small scrap of cardboard or old magazine
- Heavy tape
- Piece of insulated wire with two bare ends
- Portable radio with AM band
- Paper and pencil

1. Lay a small battery on a scrap of cardboard. Tape it down so both ends remain exposed. Bend an insulated wire into a horseshoe or U shape. Make sure the insulation is stripped off both ends, but only the ends.
2. Turn on a radio and choose the AM band. Tune the radio to the low (left) end of the frequencies, where there are fewer stations. Set it near the battery.
3. Hold the bent wire in the center where it's insulated with both hands. Move the wire so both bare ends touch the top and bottom of the battery. (Note: It needs to be bare wire touching the battery.) Try to maneuver one side of the wire so it touches the battery and then make the other end of the wire tap against the other end of the battery to complete the circuit. **DO NOT** touch the bare wire or the battery; they can get hot.
4. Listen for the static, or RFI, coming through the radio. Tune the radio

up and down, changing the signal's frequency. Does that make a difference in the noise you hear?

5. Now that you know what static sounds like, put your radio to work as a RFI detector. Make a chart to record your findings. It needs three columns, with these headings:

Object	RFI Noise	RFI Level (1–5)
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6. Turn on the AM radio and listen for RFI near different electronic devices. Record your findings on the chart, including what the RFI noise sounds like (pulses, scratching, etc.) for each object and how loud the RFI level is from 1 to 5, with 5 being very loud. Some possible objects to check: cell phones, remote-control toys, electric shavers, microwave ovens, TVs, and handheld video games.

Think about it: What objects made the most static? The least?

