

# What's with the Tinfoil Hats?



**Have you ever heard of someone wearing a tinfoil hat?** Some people wear tinfoil hats because they hope to protect themselves from radio and other electromagnetic waves.

**New technologies can cause uncertainty and fear.** When voices and images were first carried over radio waves, it was a huge leap forward for communications, but it made some people uncomfortable. Radio waves from our communication devices are all around us, and can pass through trees, walls, and even our bodies! This can be scary, even though the low energy levels of radio waves are safe.

Because metal can block radio waves, some people believe tinfoil hats protect them from unknown negative effects. But tinfoil hats **cannot completely block** radio waves from the wearer's head. You would have to completely wrap yourself in tinfoil to stop all radio waves from entering your body. This *very fashionable* tinfoil bodysuit would be your own personal **Faraday cage!**



# What Happened to the Music?

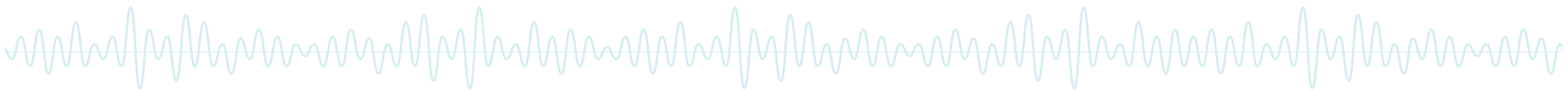


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**Have you ever noticed that you can hear FM radio stations on a car radio longer in a tunnel compared with AM stations?** That's because FM stations transmit radio waves with shorter wavelengths. A single radio wave from an FM station is only a few meters long, about the size of a car. An AM station is pumping out radio waves that are hundreds of meters longer, similar to the height of the Statue of Liberty!

Longer-wavelength radio waves tend to be absorbed or blocked as they try to enter the smaller tunnel. But the higher-energy, shorter-wavelength radio waves from an FM station can sneak into the tunnel and bounce around to reach further inside.

Of course, these FM radio waves can only bounce around so far. If the tunnel is long enough, even FM stations will fade out before you come out the other end. Maybe you should start singing to fill the silence?



# Radio Waves on the Electromagnetic Spectrum

**Radio waves are one form of electromagnetic waves that travel throughout our universe.** Radio waves have longer wavelengths and lower energy compared to other electromagnetic waves, like microwaves we cook with or the light we can see.

**Different devices use different parts of the electromagnetic spectrum.** AM and FM settings use radio waves with longer wavelengths than cell phones. Most radio waves are not blocked by Earth's atmosphere, allowing us to communicate with satellites, spacecraft, and, one day, maybe even alien civilizations.

