Why are Radio Telescopes built on ground ?

The gases that comprise our atmosphere absorb radiation in certain wavelengths while allowing radiation with differing wavelengths to pass through. The areas of the EM spectrum that are absorbed by atmospheric gases such as water vapor, carbon dioxide, and ozone are known as absorption bands. The ability of the atmosphere to allow radiation to pass through it is referred to as its transmissivity, and varies with the wavelength/type of the radiation. In the figure, absorption bands are represented by a low transmission value. From the figure (2.1), we can see the atmospheric window in radio region of the EM Spectrum.

The radio band contains a large range of frequencies that can travel through the Earth's atmosphere unimpeded and so provides an excellent realm for the detection and study of EM radiation from space. The radio window, as it can be called, ranges in frequency from 10 MHz (1×10^7 Hz) up to 300 GHz (3×10^{11} Hz), or in wavelengths from 30 m down to 1 mm. The energies of

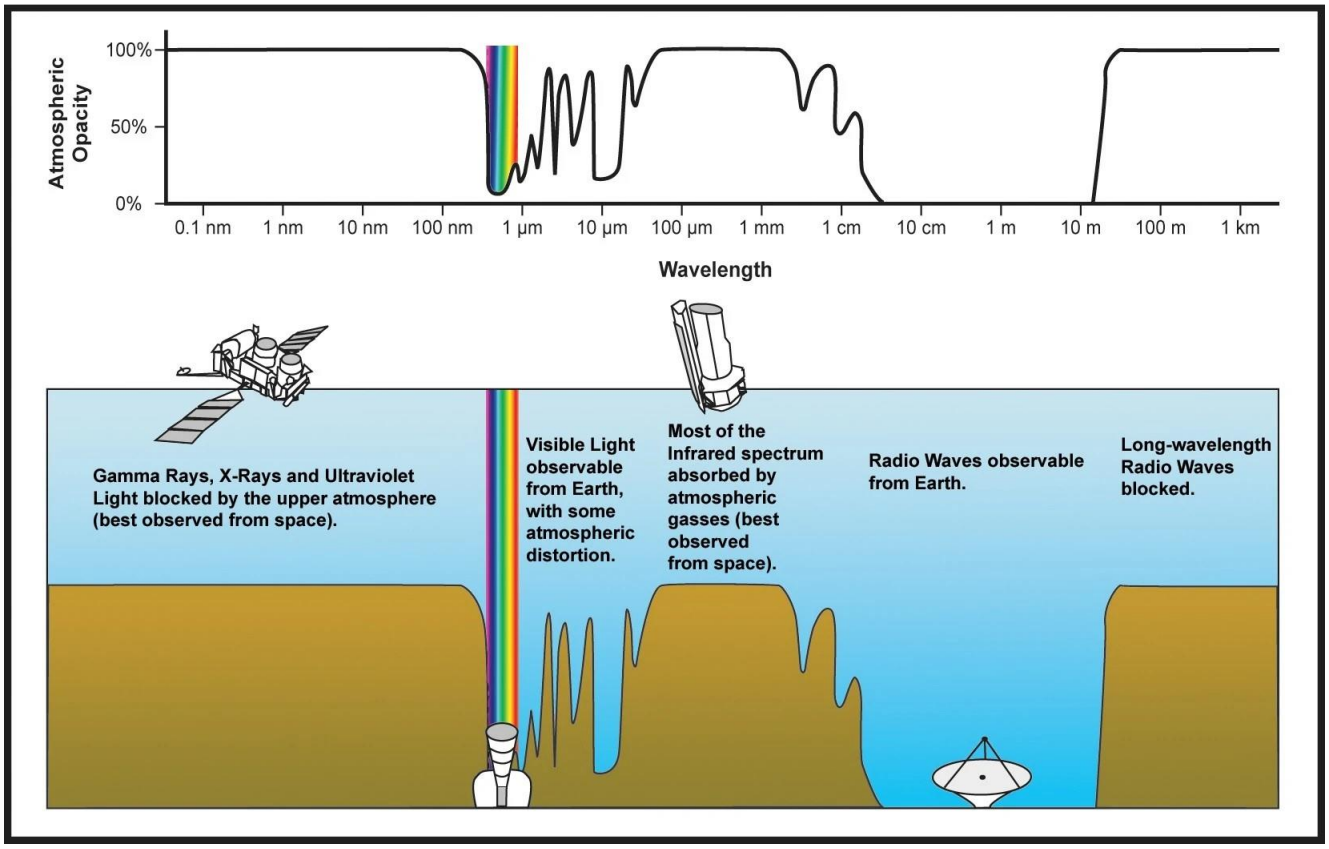

Figure 2.1

radio photons range from about 10–19 to 10–15 ergs—that is, very tiny!!! The boundaries of the radio window are due to atmospheric and ionospheric processes. At low frequencies (below about 10 MHz), free electrons present in the ionosphere easily absorb and/or reflect radiation. Frequencies below this can be generated and transmitted on the Earth's surface, but they cannot escape through the ionosphere. Likewise, waves with frequencies less than 10 MHz arriving from space cannot penetrate the ionosphere to reach ground-based radio telescopes. Frequencies below about 10 MHz must be observed from space-based radio telescopes.