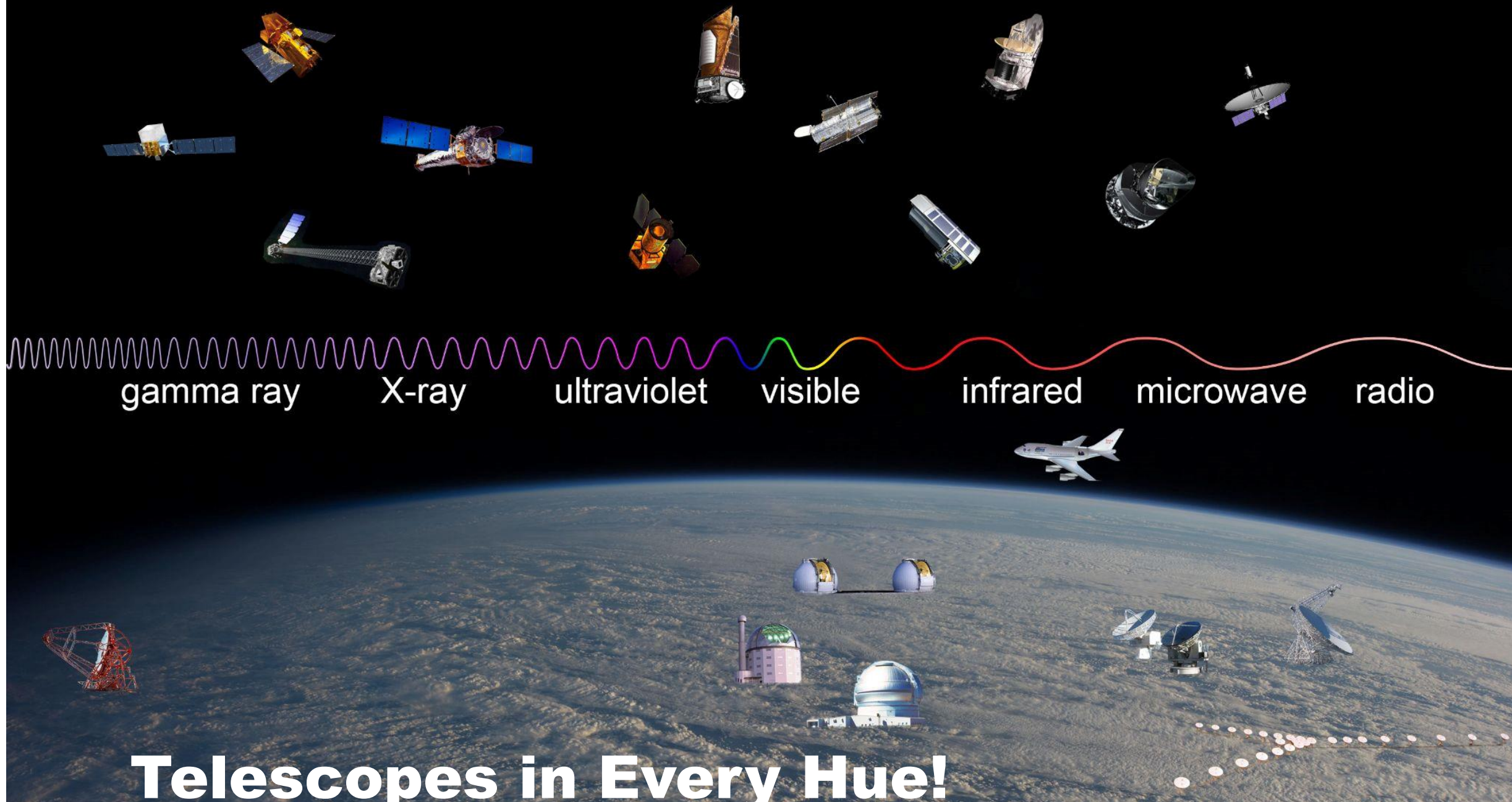
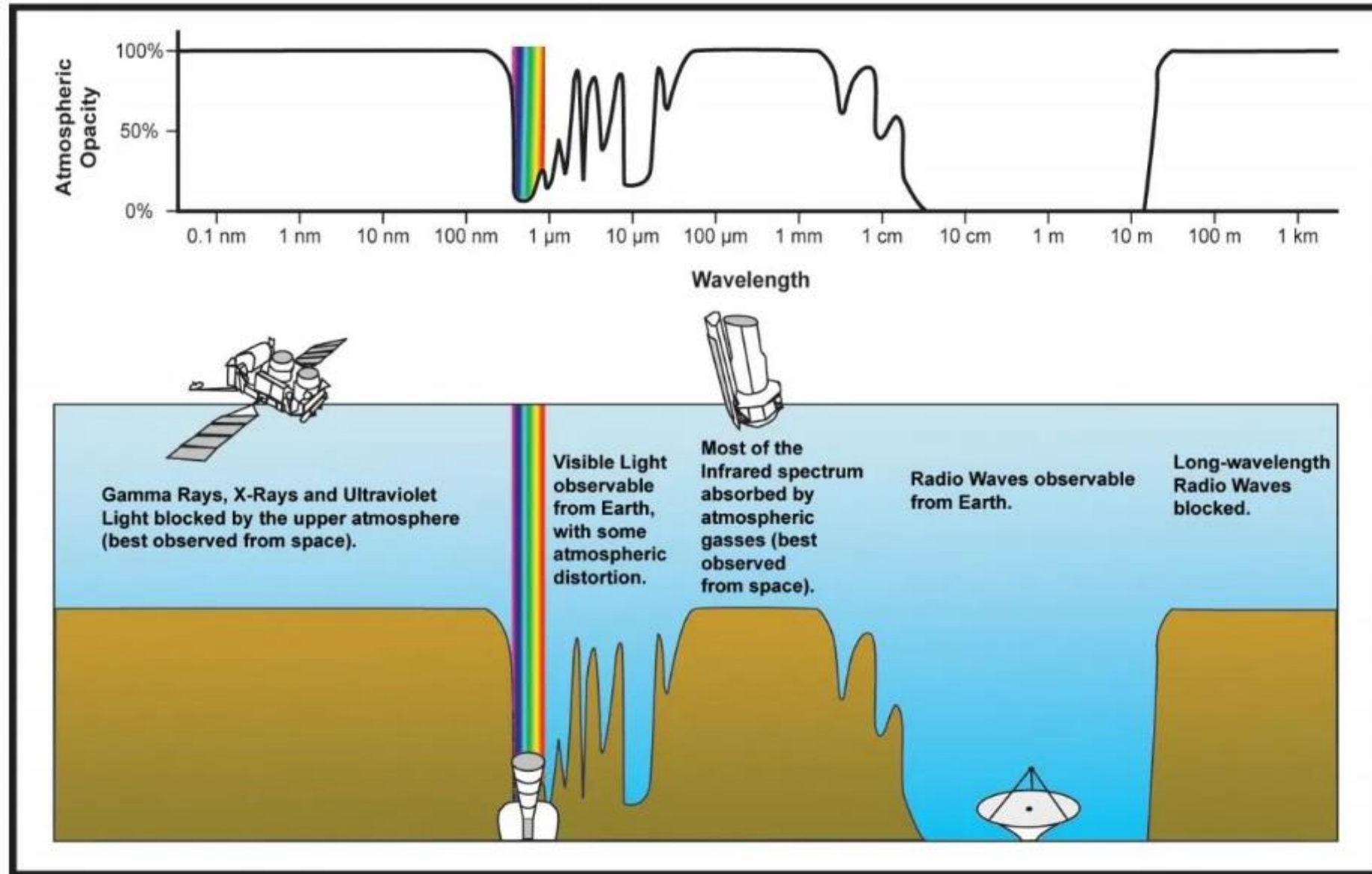


# Cosmic Kaleidoscope of Wavelength Wonders



**Telescopes in Every Hue!**

# Telescope Tango: Ground vs. Space





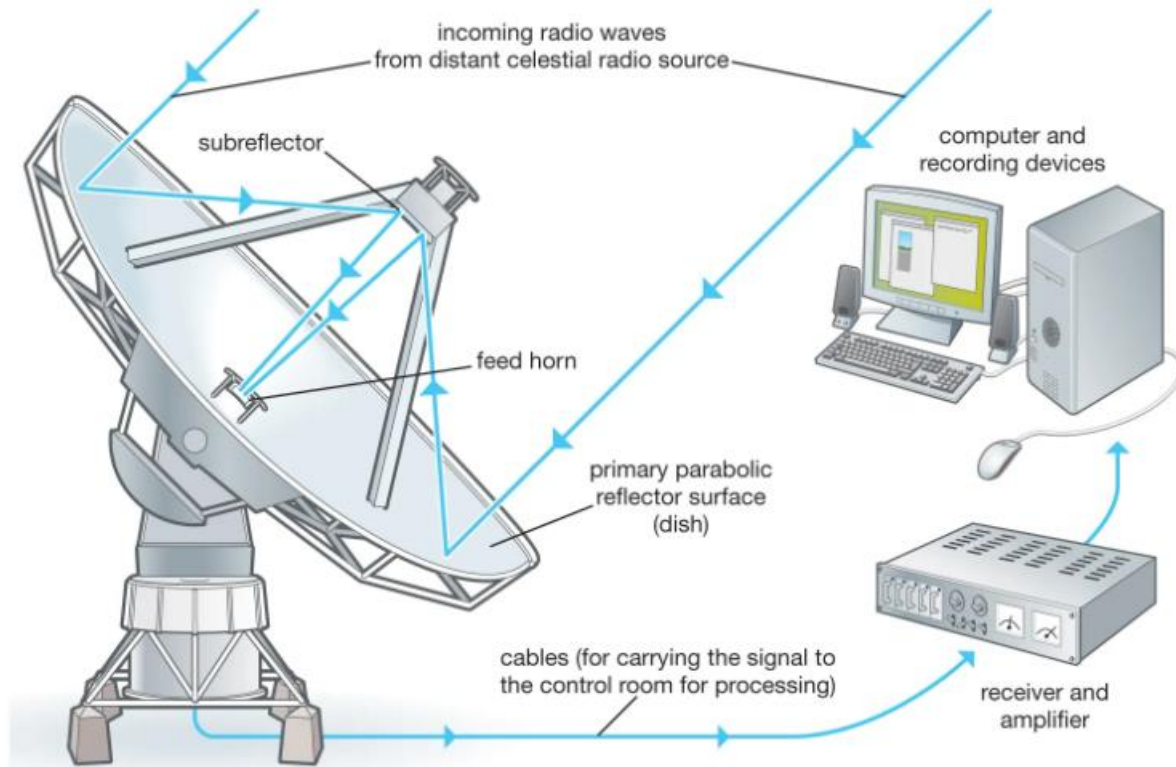
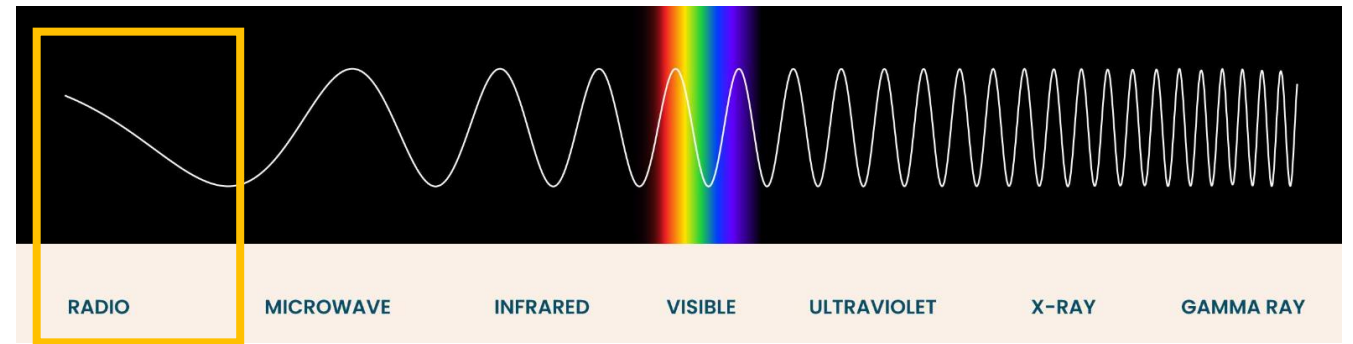
# Cosmic Rainbow



Infrared –yellow  
Radio- red  
Visible – green  
Ultraviolet – blue  
X-ray - purple



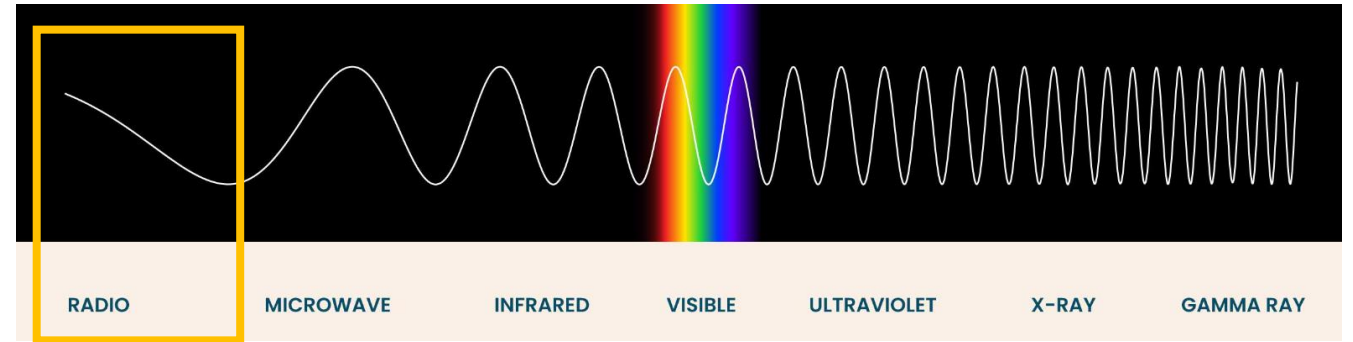
# Radio Telescope



© 2012 Encyclopædia Britannica, Inc.



# Radio Telescope



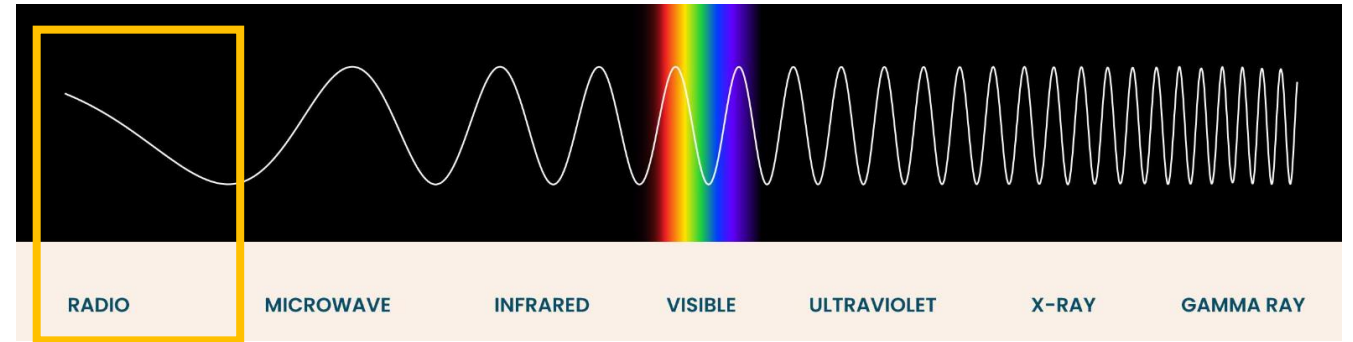
<https://iram-institute.org>

**Single Dish Telescope**

**IRAM 30 Meter Telescope**



# Radio Telescope

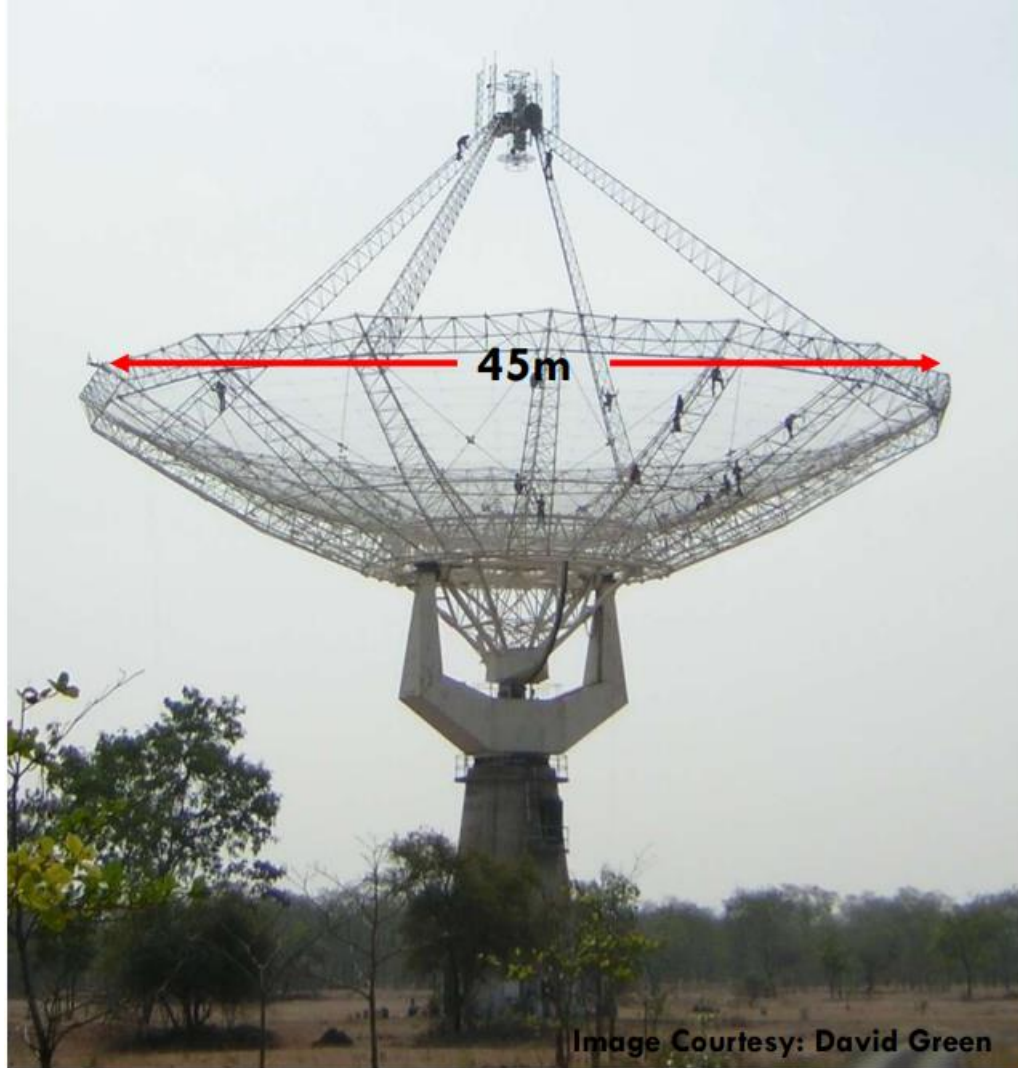


Shortest spacing  $\sim 100\text{m}$ ; largest spacing  $\sim 25\text{km}$

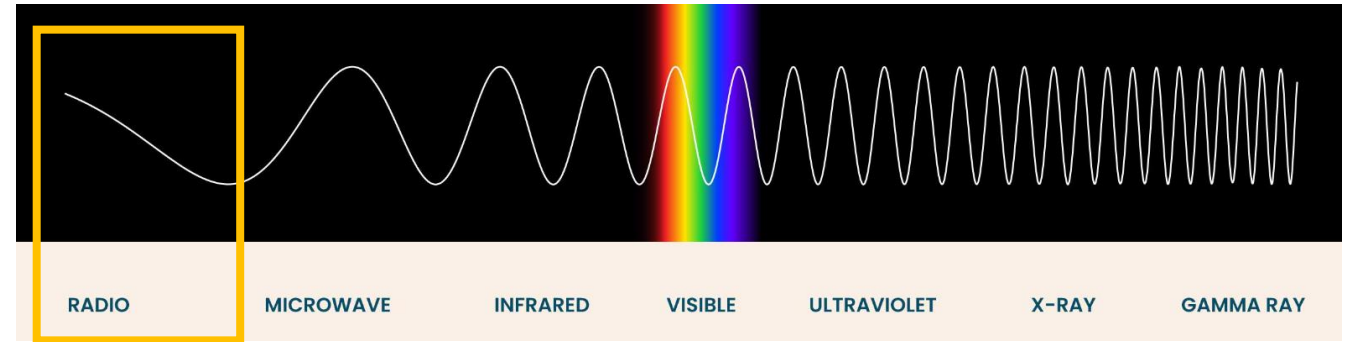
## Interferometry

## Giant Meter Radio Telescope

# Radio Telescope



One of the 30 dishes of GMRT

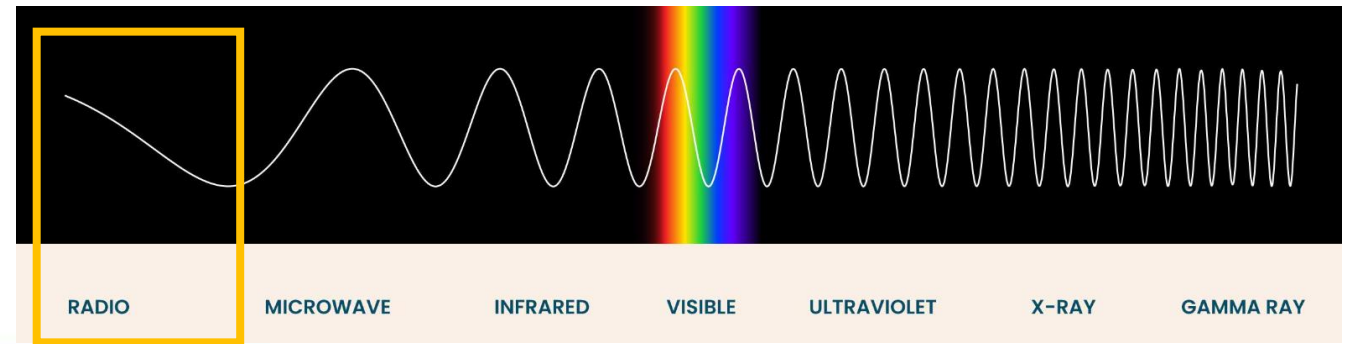


## Interferometry

## Giant Meter Radio Telescope

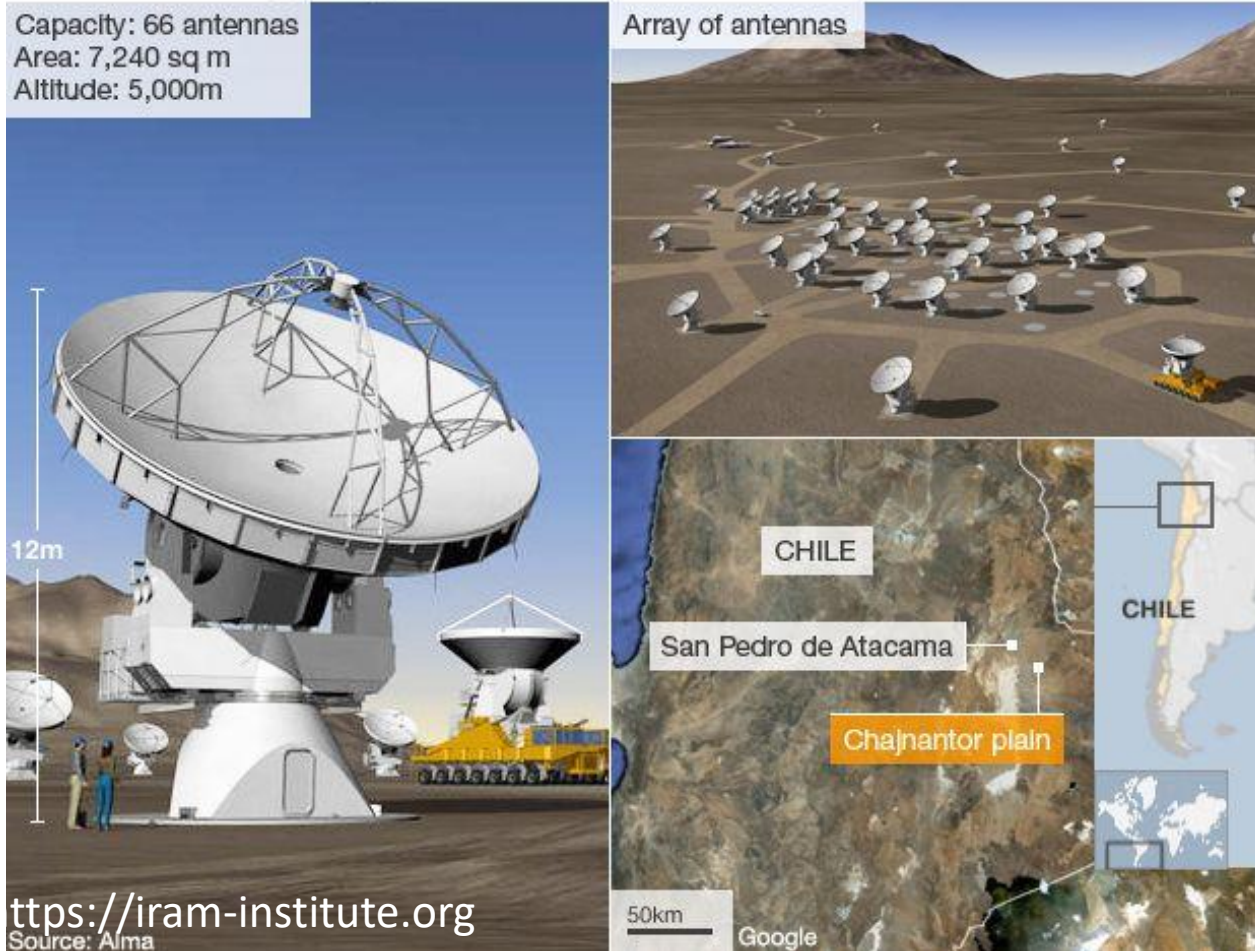


# Radio Telescope



Alma Observatory at high altitude in Atacama desert

Capacity: 66 antennas  
Area: 7,240 sq m  
Altitude: 5,000m

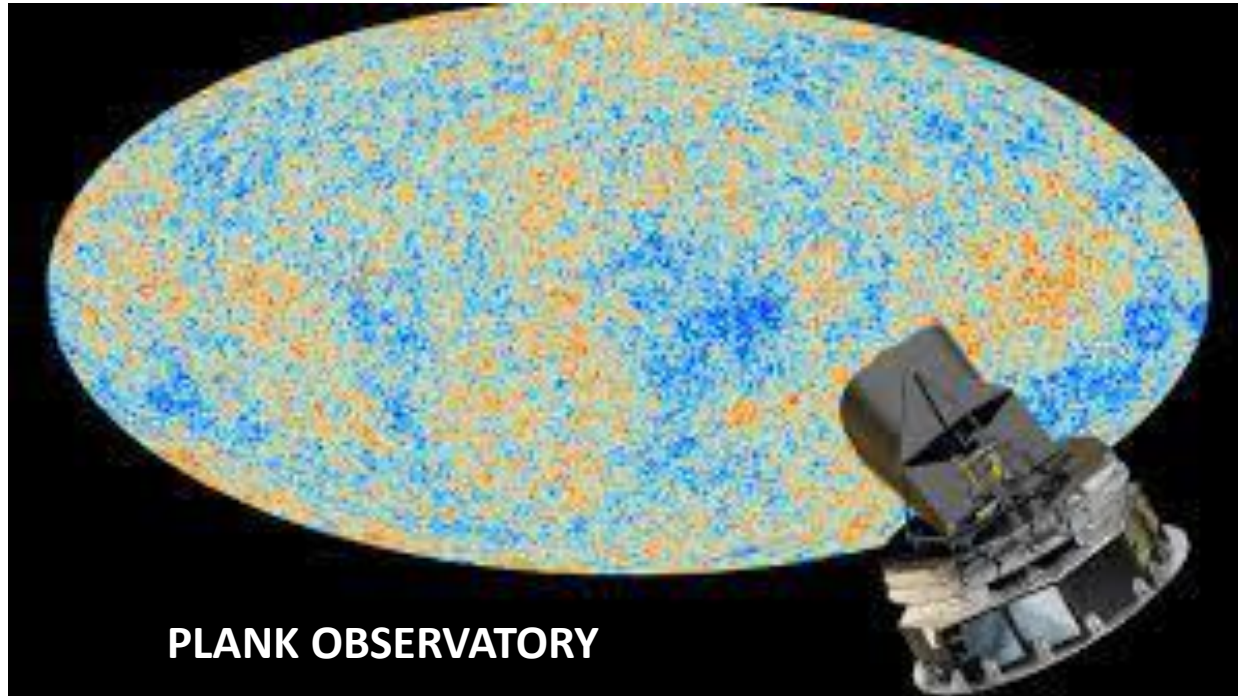
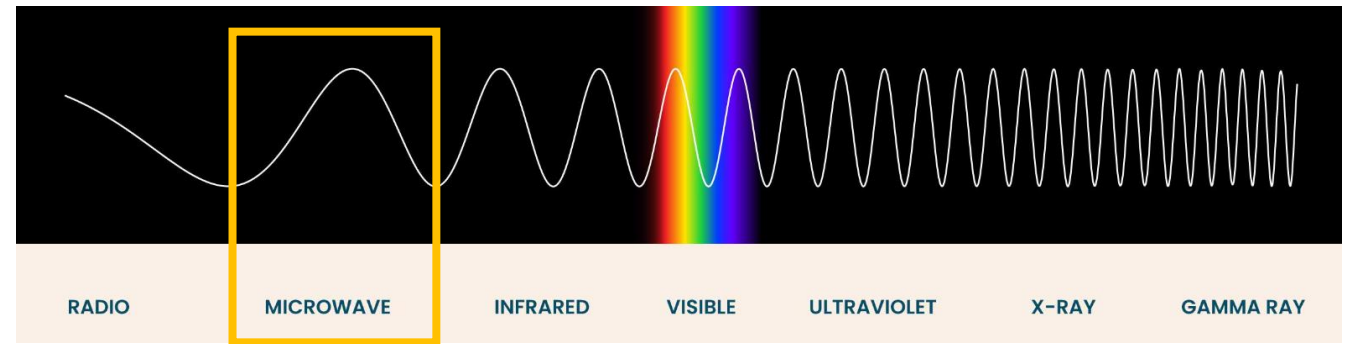


<https://iram-institute.org>  
Source: Alma

## Interferometry

## Giant Meter Radio Telescope

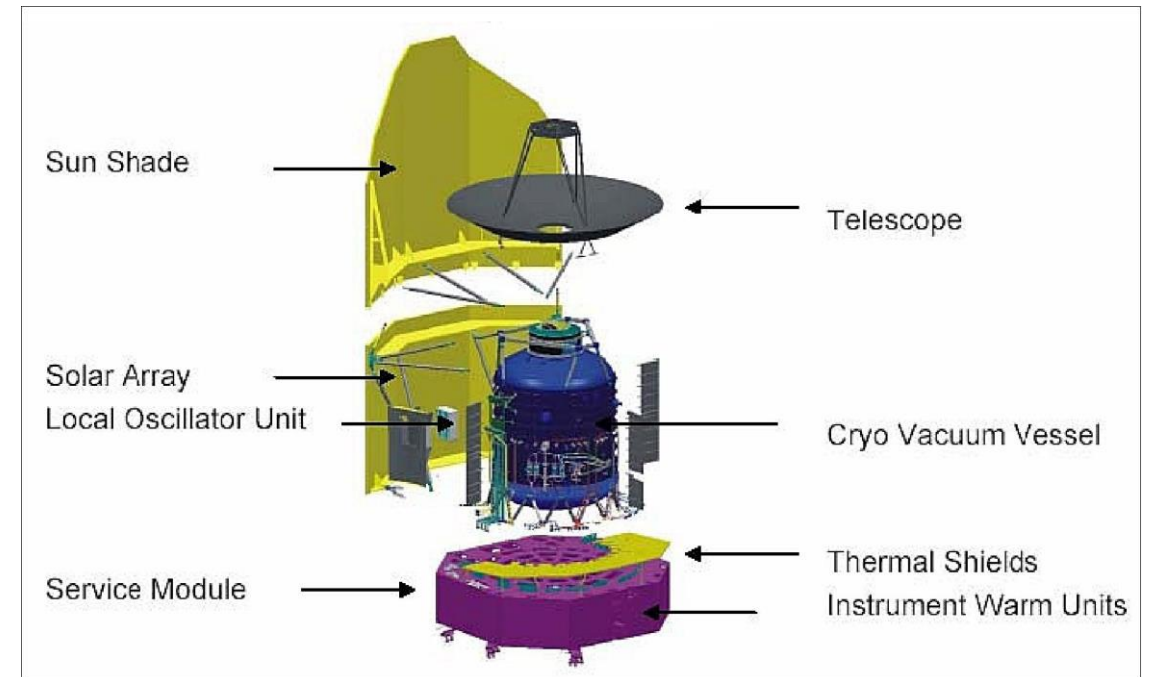
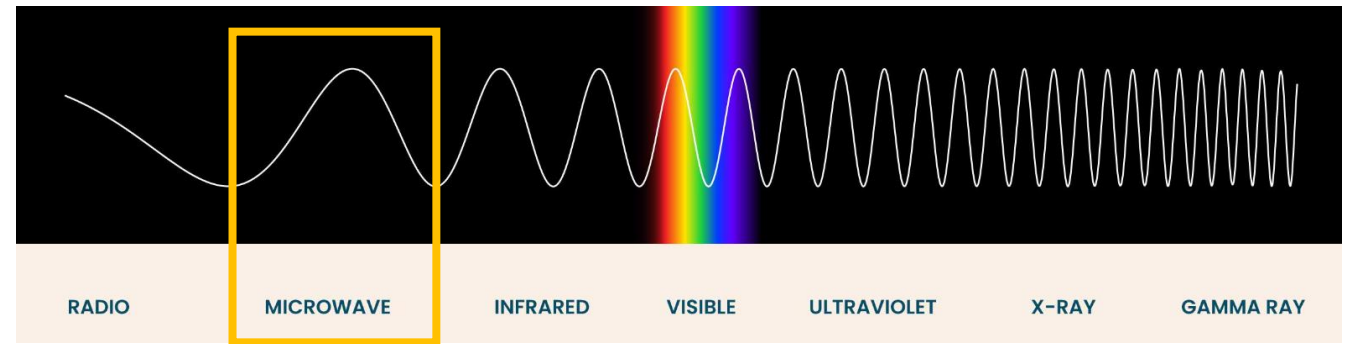
# Microwave Telescope



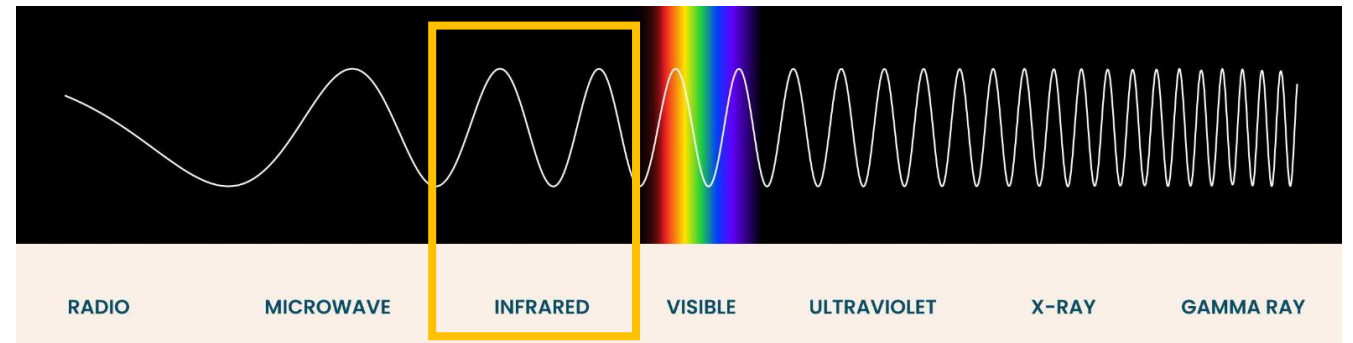


# Microwave Telescope

## Herschel Telescope



# Infrared Telescope



Space based

JAMES WEBB SPACE TELESCOP

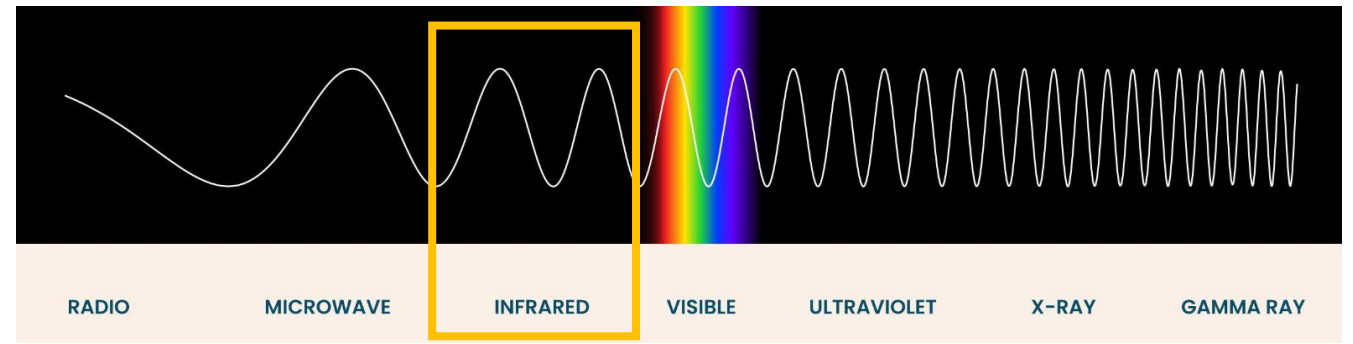
Airborne

SOFIA





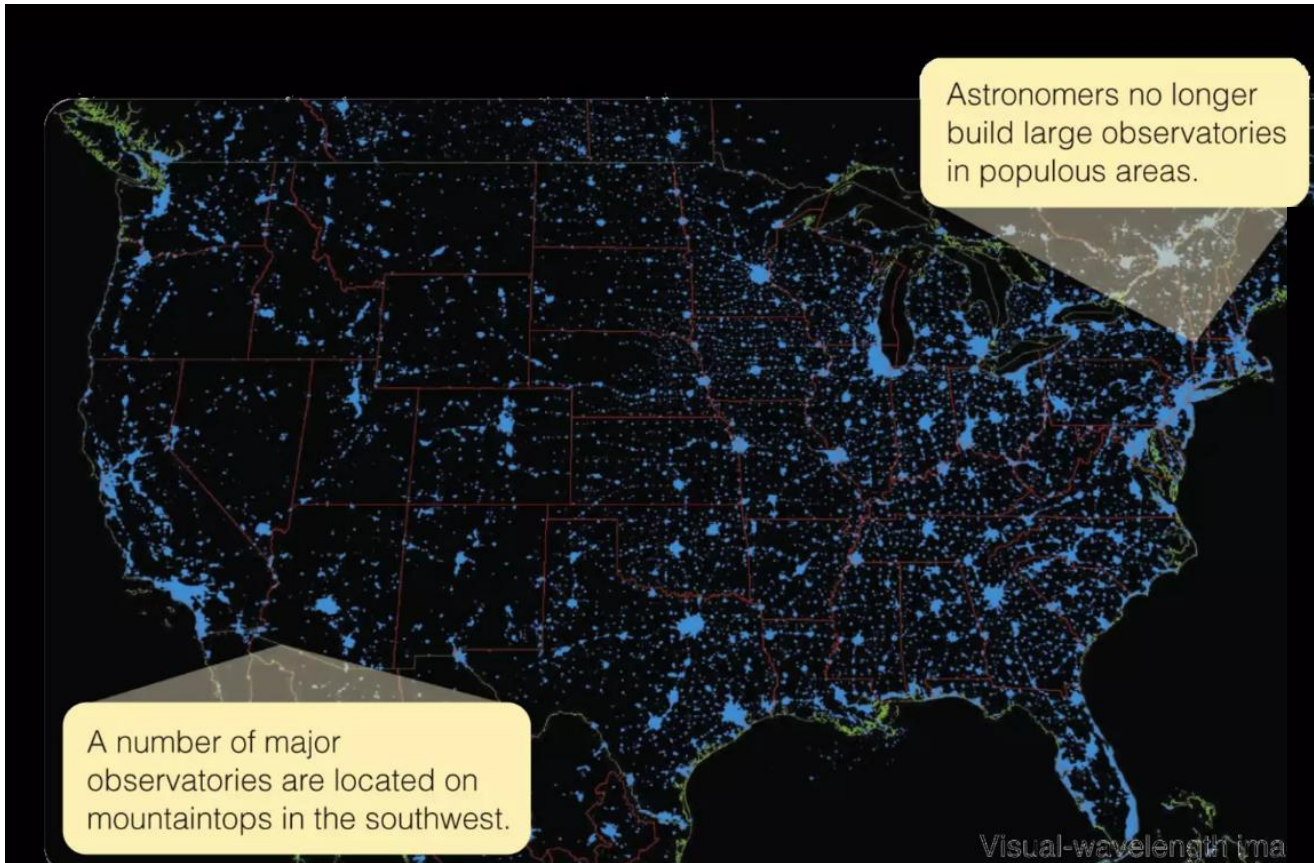
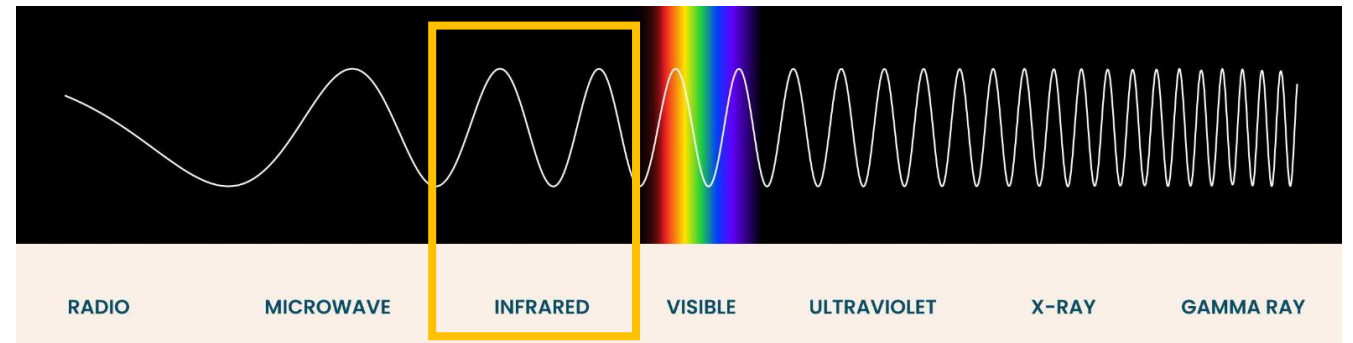
# Infrared Telescope



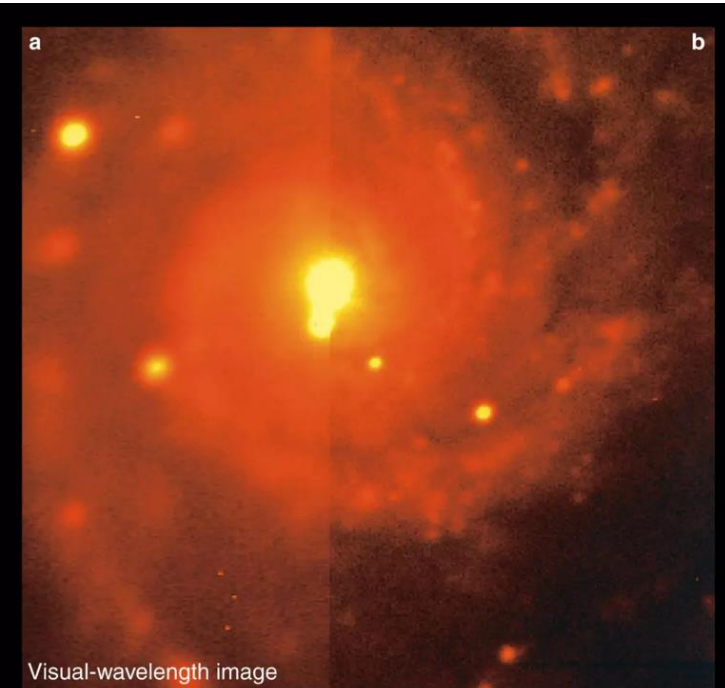
Ground based



# Infrared Telescope



Weather conditions and turbulence in the atmosphere set further limits to the quality of astronomical images.

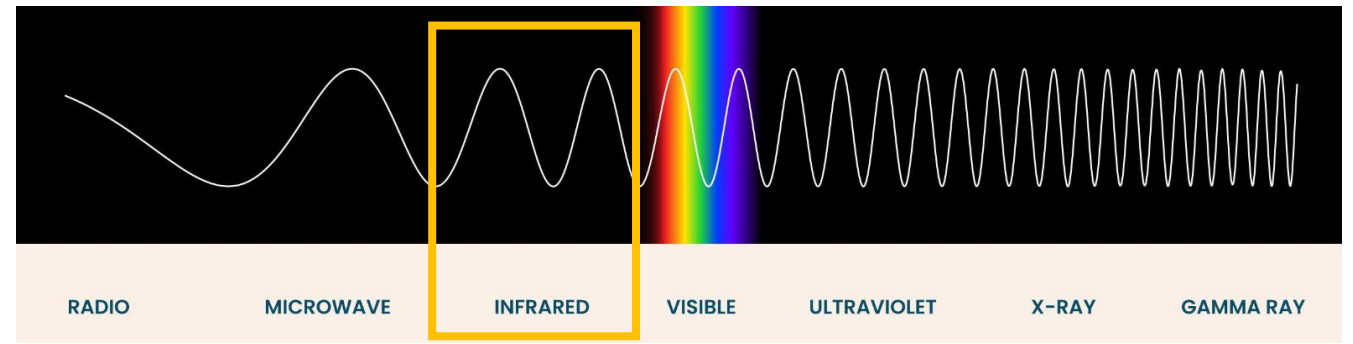


Bad seeing

Good seeing

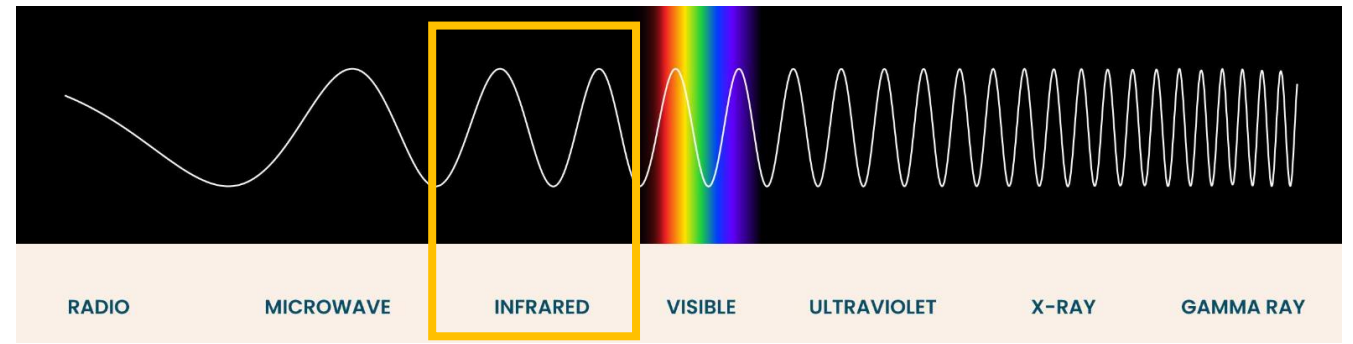


# Infrared Telescope

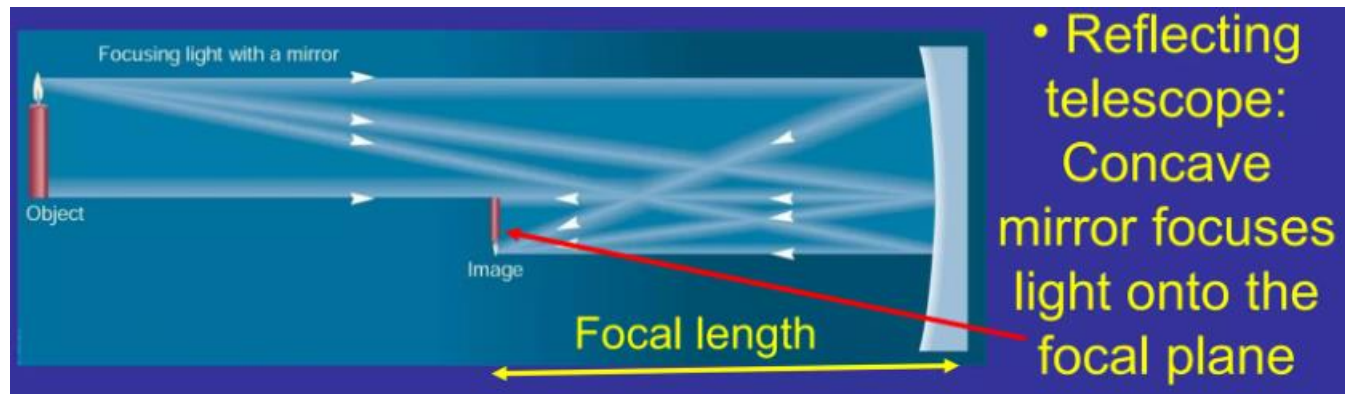
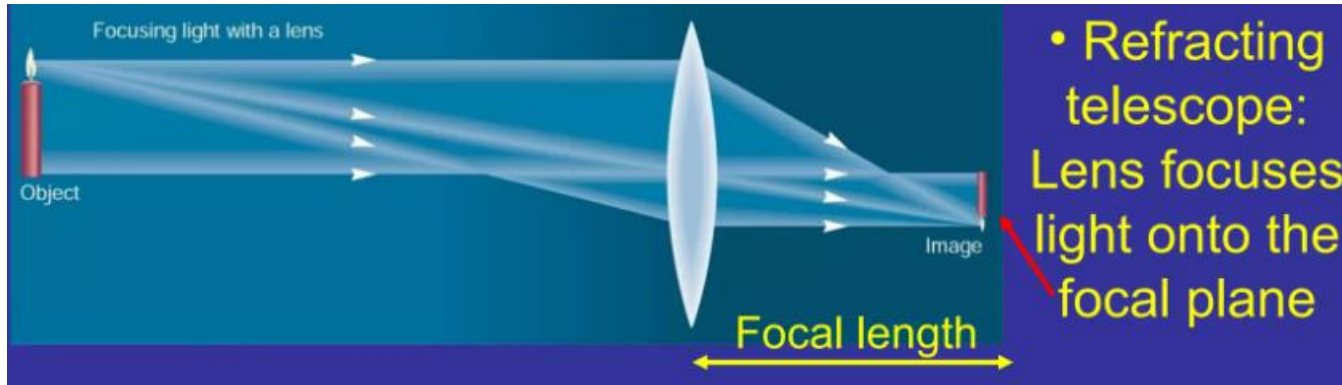


On high mountain-tops—to avoid atmospheric turbulence (→ seeing) and other weather effects.

# Infrared Telescope



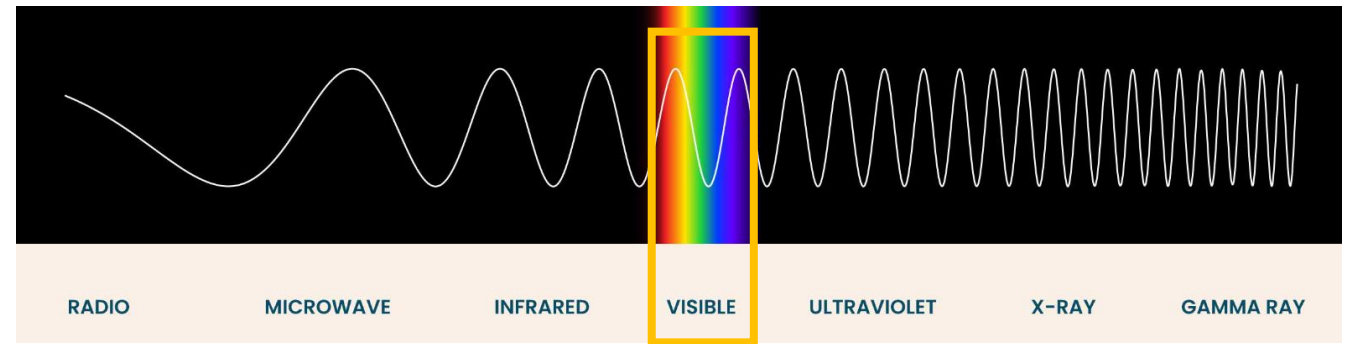
## Reflecting/Refracting Telescope



All modern telescopes are **Reflecting telescopes**.



# Optical Telescope



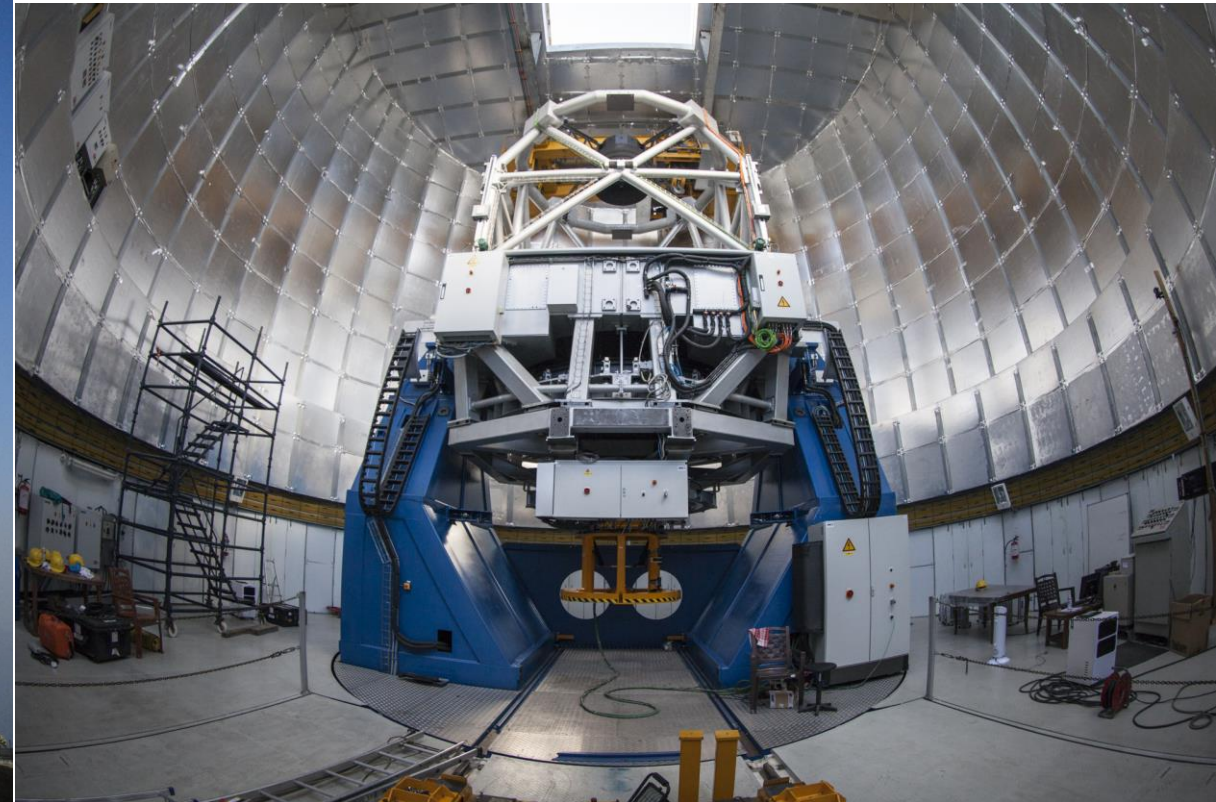
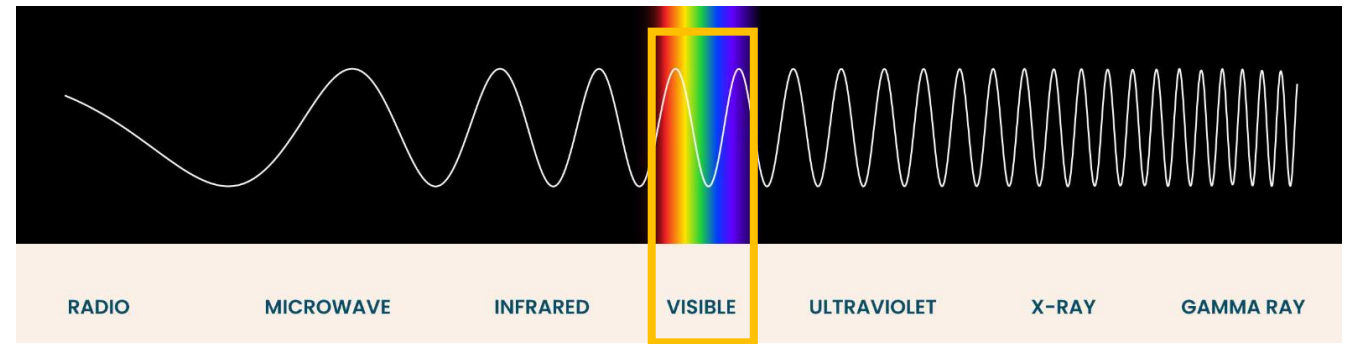
## Hubble Space Telescope



NASA

# Optical Telescope

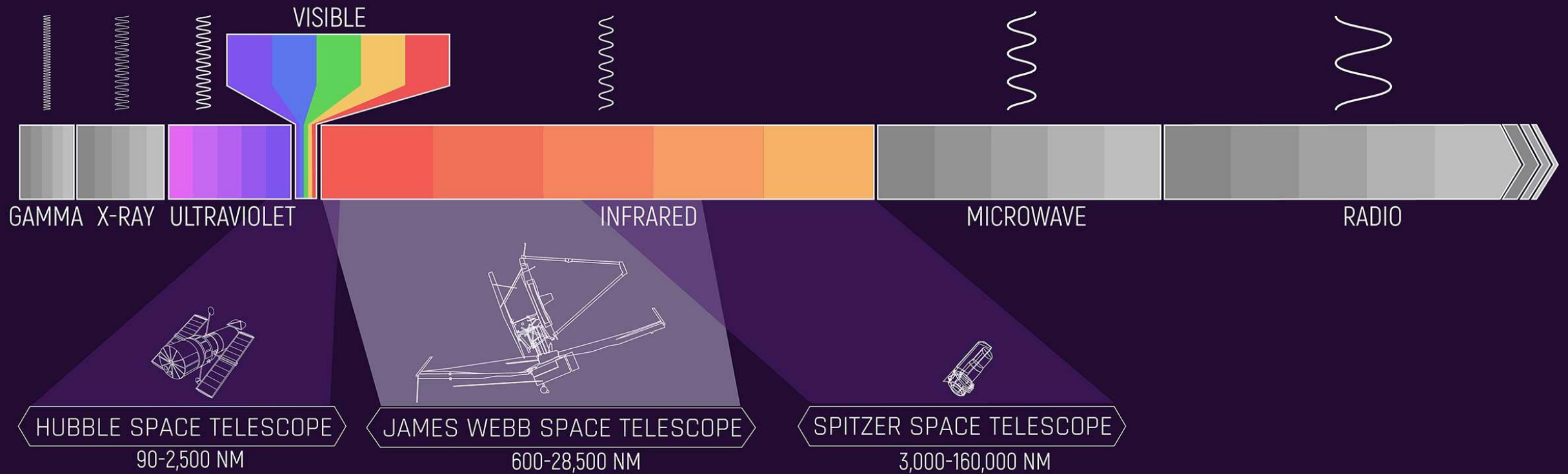
## 3.6m Devasthal Optical Telescope



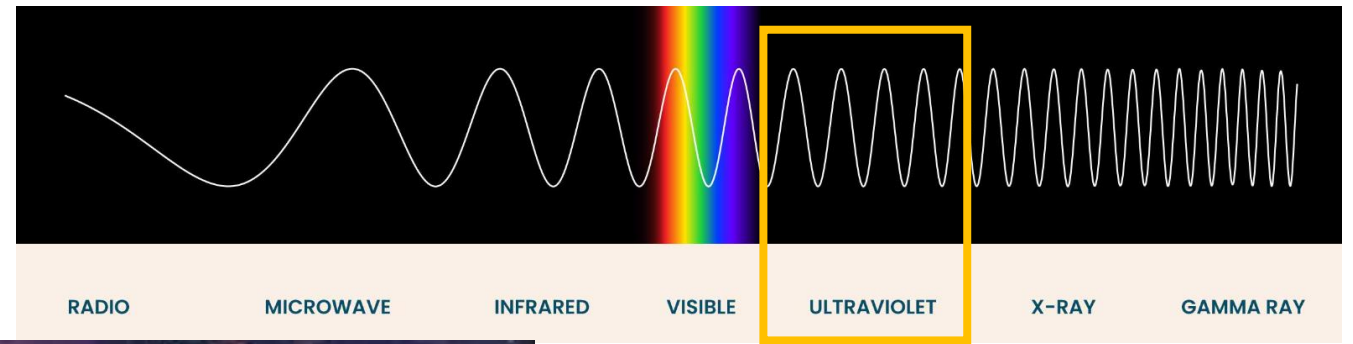
ARIES



# ELECTROMAGNETIC SPECTRUM

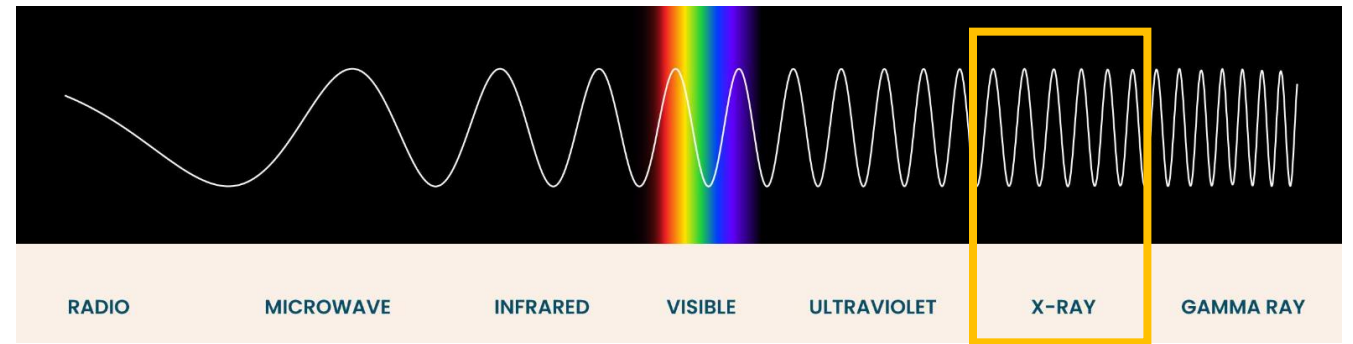


# Ultraviolet Telescope

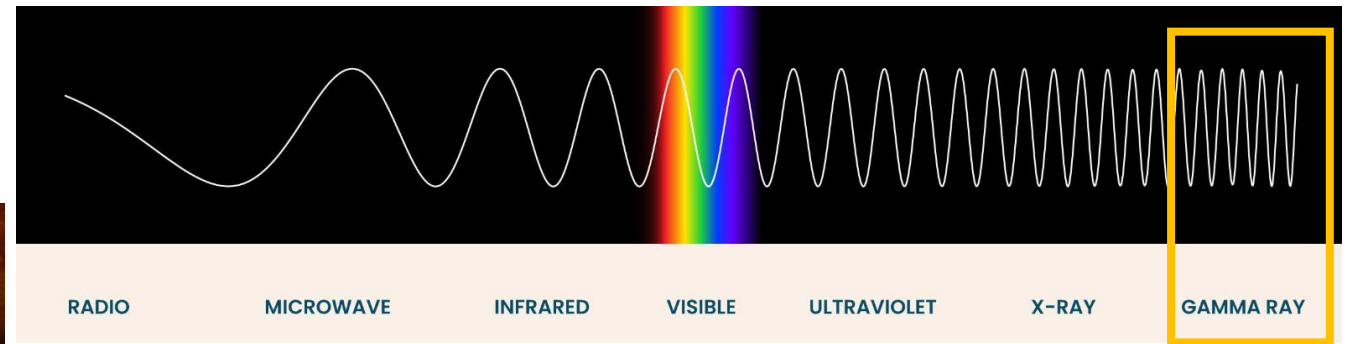




# X-ray Telescope



# $\gamma$ - Ray Telescope



## FERMI Telescope