
OzGrav
ARC Centre of Excellence for Gravitational Wave Discovery
MISSION:
GRAVITY

MISSION REVIEW

Understanding stars

What do you know (or think you know) about stars?

Star properties

Measure

Barriers

USE WAVELENGTH TO FIND TEMEPERATURE

Radio

Microwave

Infrared

Visible Light

Ultraviolet

X-Ray

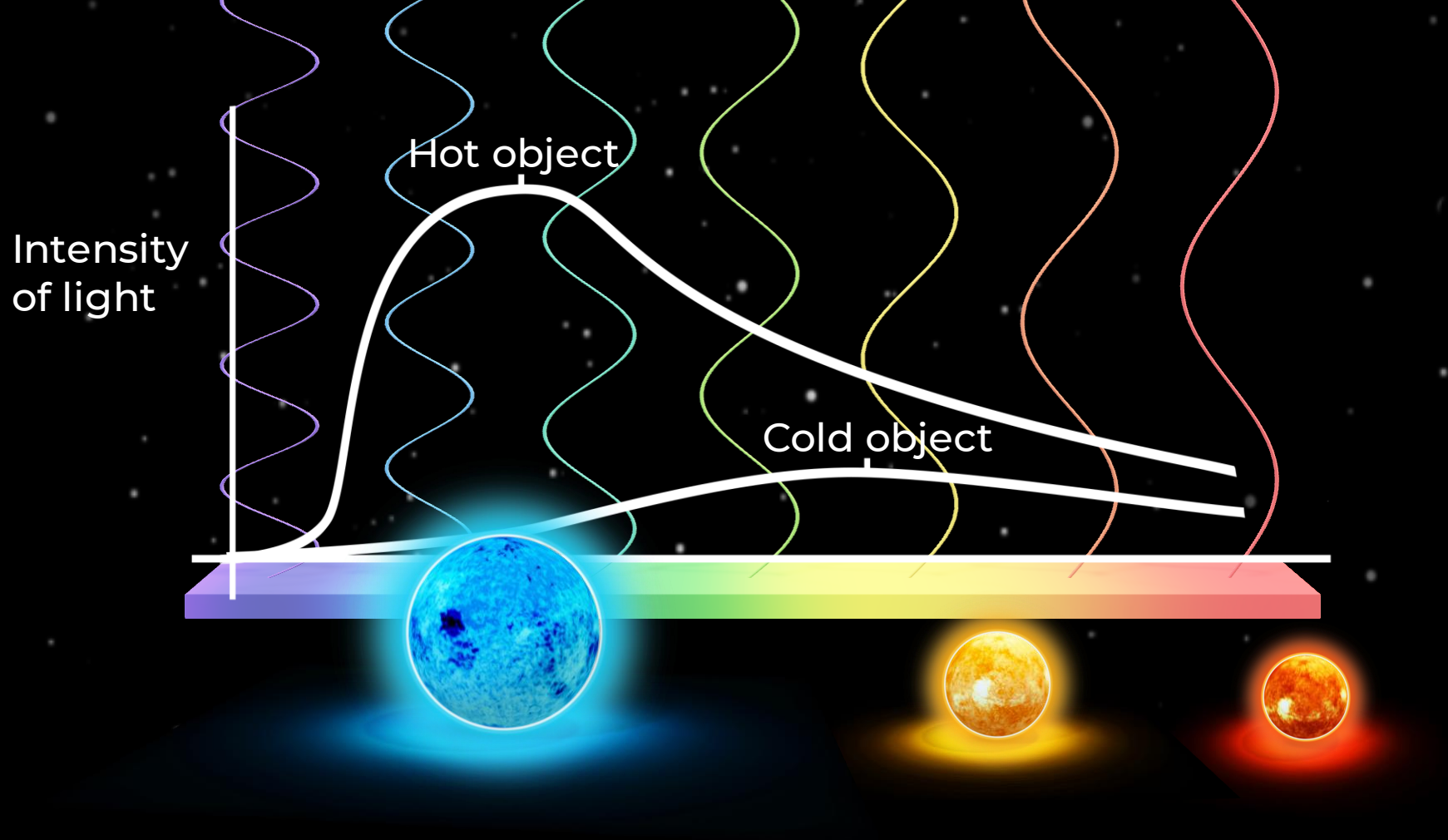
GammaRay

Hot objects such as stars radiate energy in the form of **light** and **heat**

Light is a wave.

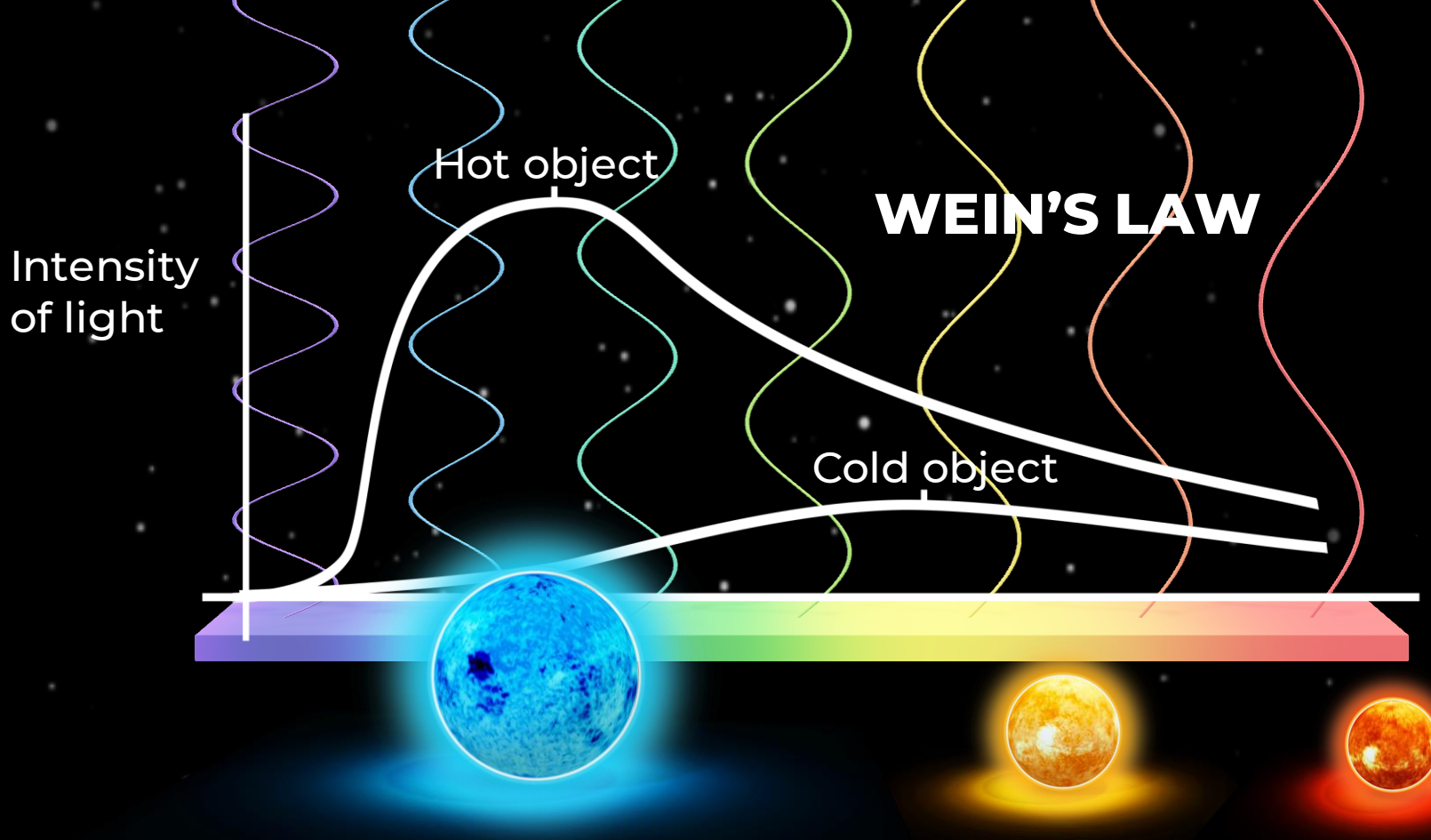
The colour of the light depends on the wavelength of the light wave.

Blue light has a short wavelength compared to red light which is long



The wavelength of the light can provide the temperature of the star.

Shorter wavelength light waves are more energetic and indicate hotter stars



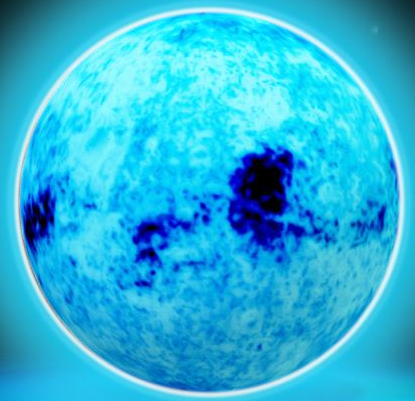
Wien's displacement law relates the peak wavelength (in nanometers) and the temperature (in degrees Kelvin)

$$Temperature\ (K) = \frac{2{,}900{,}000\ K \cdot nm}{Wavelength\ (nm)}$$

Example: **if the peak wavelength is 500 nm**

$$T(K) = \frac{2{,}900{,}000\ K \cdot nm}{500\ nm} = 5{,}800\ K$$

USE ANGLE TO FIND DIAMETER



Geometric relationships are used to find the size of objects in the universe

The size of the star will change depending on how far away the observer is

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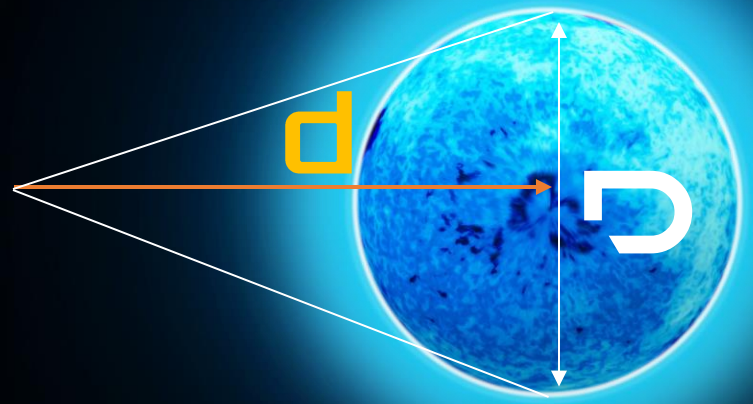
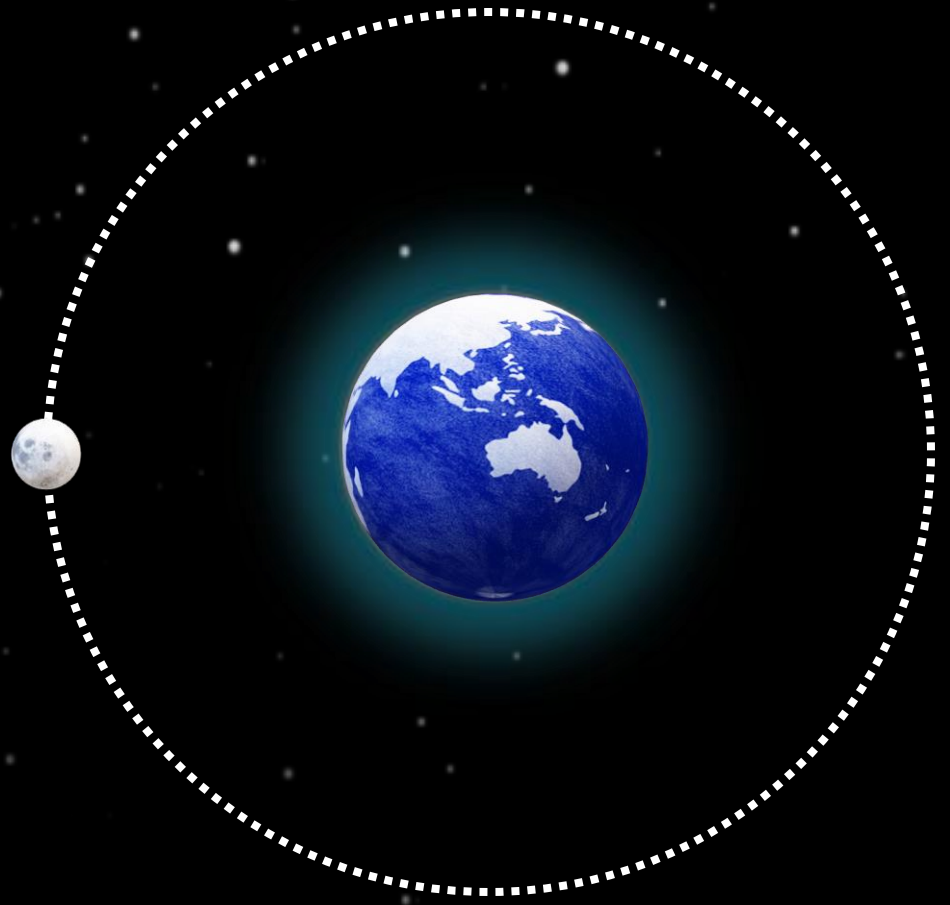


To find the diameter of the star,
use the following trigonometric relation for small angles

$$D = d \times \theta$$

USE ORBITAL MOTION TO FIND MASS

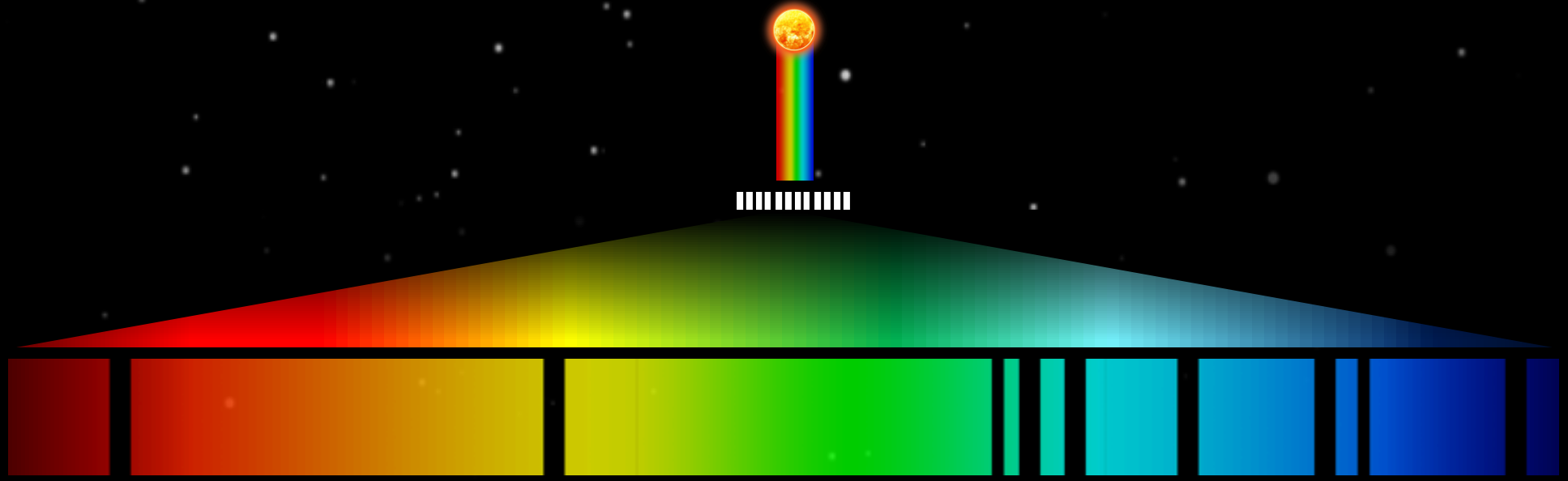
The motion of an orbiting object provides information about the object being orbited.

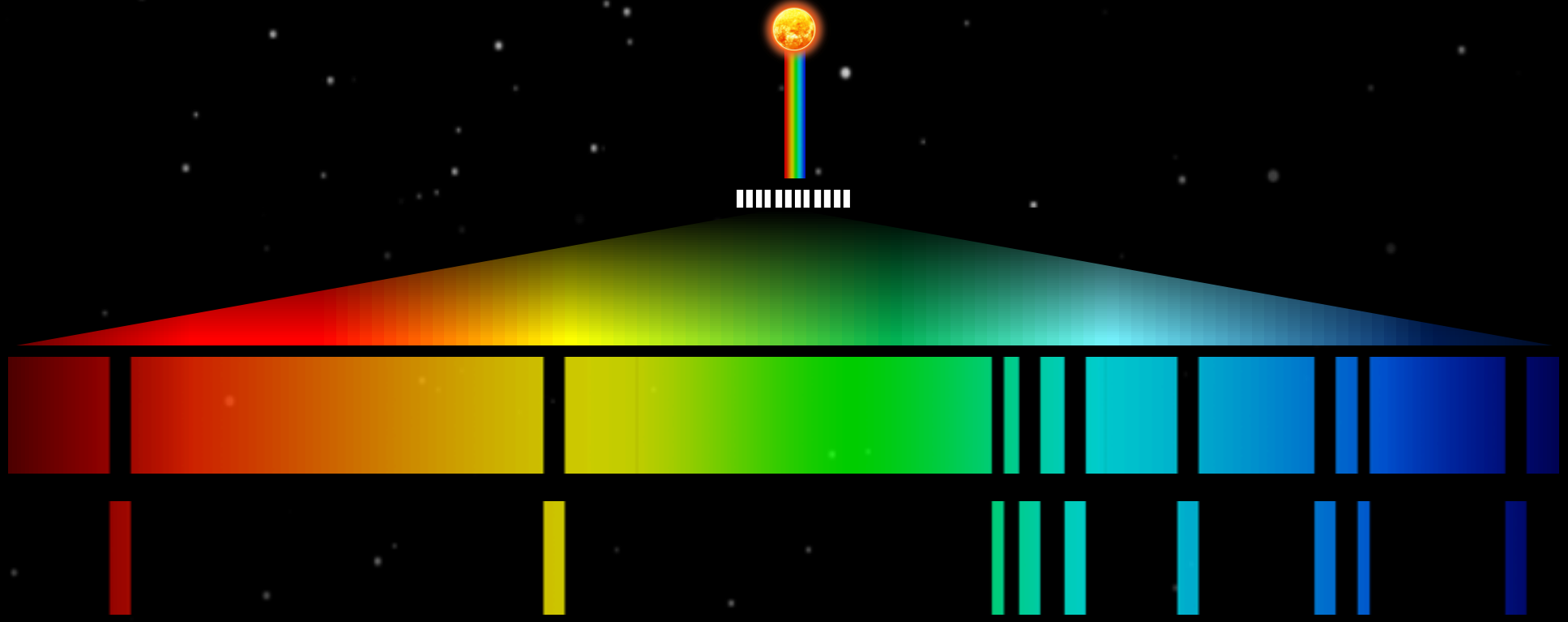



USE SPECTRA TO FIND COMPOSITION

Light from a star is a combination of many colours (wavelengths) of light

When light is spread through a diffraction grating, it shows the colour prism with some conspicuous dark lines



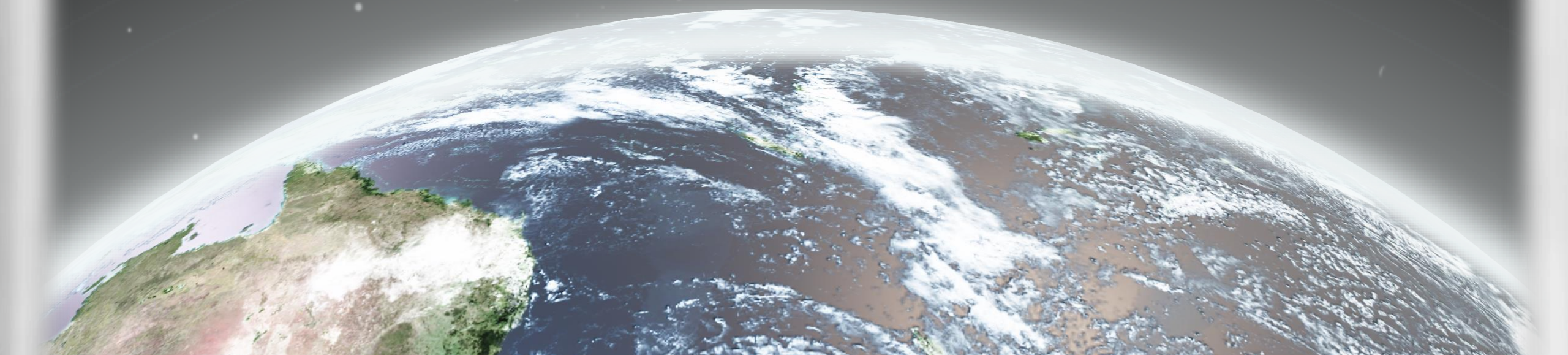


The location of these dark lines in the spectrum
correspond to the dominant elements in the stars

GROUND CONTROL PREPARATION

EXPERIMENTAL DESIGN:

- Identify independent and dependent variables
- Identify experimental pairs and process
- Identify observed vs. calculated parameters

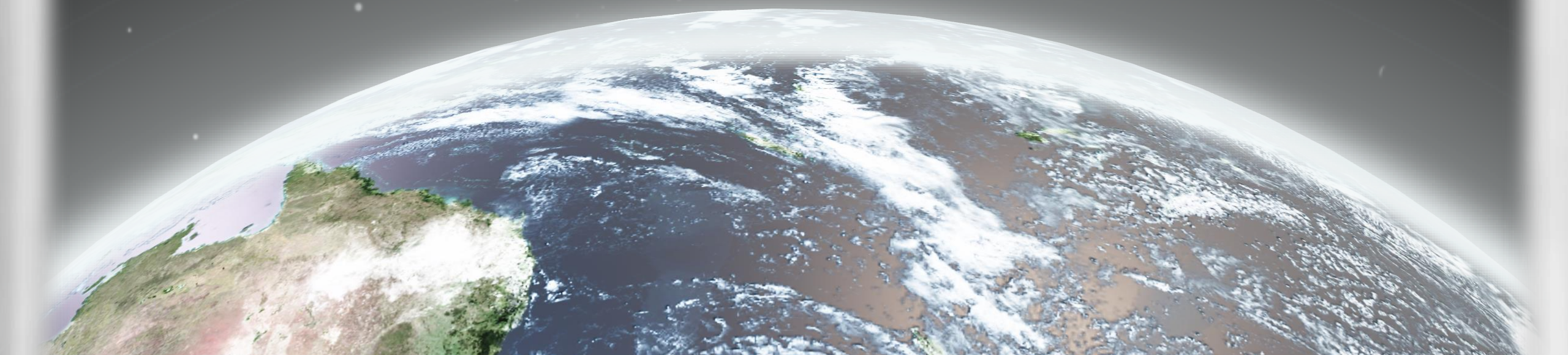


EXPERIMENTAL DESIGN:

- Identify independent and dependent variables
- Identify experimental pairs and process
- Identify observed vs. calculated parameters

GET READY:

- Data Tables
- Pens
- Roles



VIRTUAL REALITY

Tools in VR – using the remote… what do the buttons do, etc.

Navigating in VR – what are the major controls to move through space, time, use tools, etc.

All mission controls are driven by the front button: This is a combination touch trackpad and touch-sensitive button

Press and HOLD to re-center (Don't just press)

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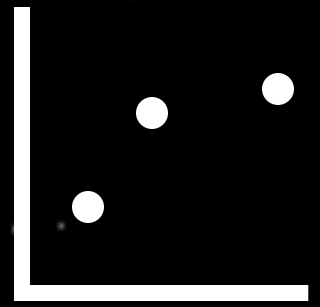
SPACE SAFETY


Listen carefully to all instructions
Remain seated
Small motions with controllers
Ensure equipment remains as you found it
Do not harass the pilot

RESULTS AND MODELS

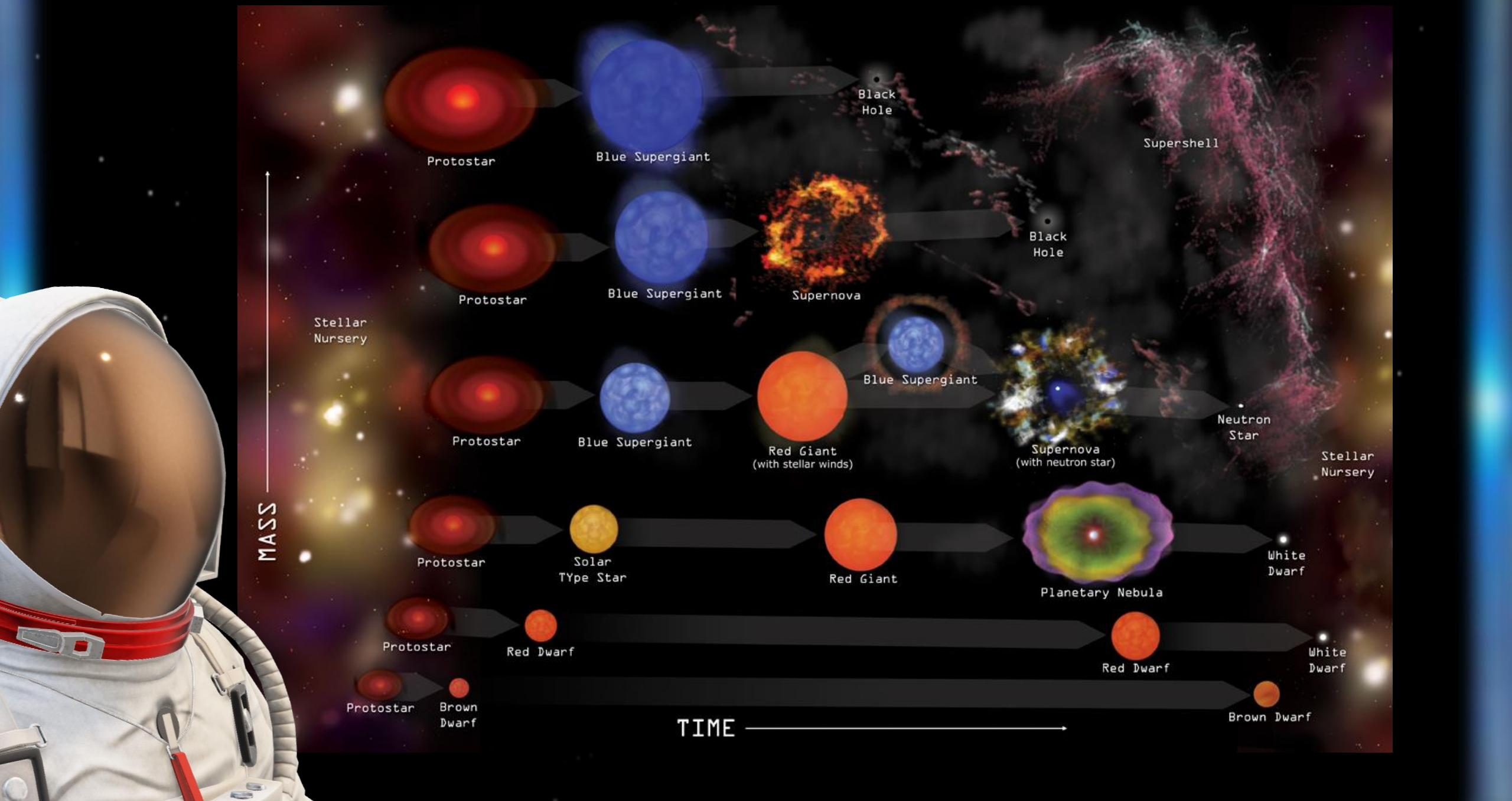
RESULTS AND MODELS

VERBAL



GRAPHICAL

PICTORAL


Protostar
Blue Supergiant
Black Hole
Supershell
Protostar
Blue Supergiant
Supernova
Black Hole
Stellar Nursery
Protostar
Blue Supergiant
Blue Supergiant
Red Giant (with stellar winds)
Supernova (with neutron star)
Neutron Star
Stellar Nursery
MASS
Protostar
Solar TYpe Star
Red Giant
Planetary Nebula
White Dwarf
Protostar
Red Dwarf
Red Dwarf
White Dwarf
Protostar
Brown Dwarf
Brown Dwarf
TIME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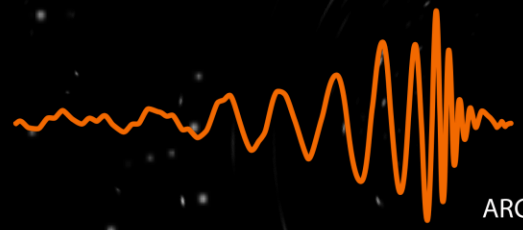

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