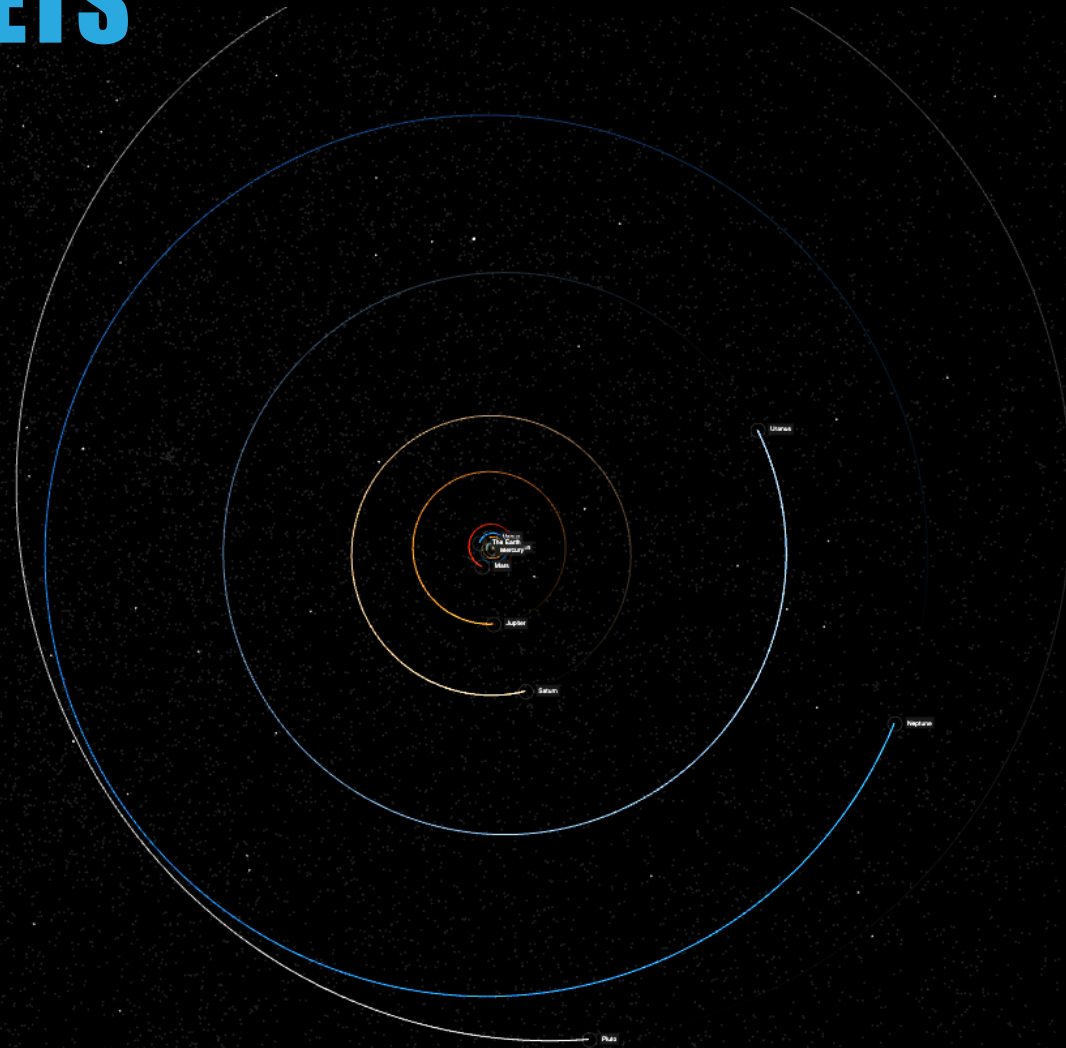


# GRAVITY AND ORBITS

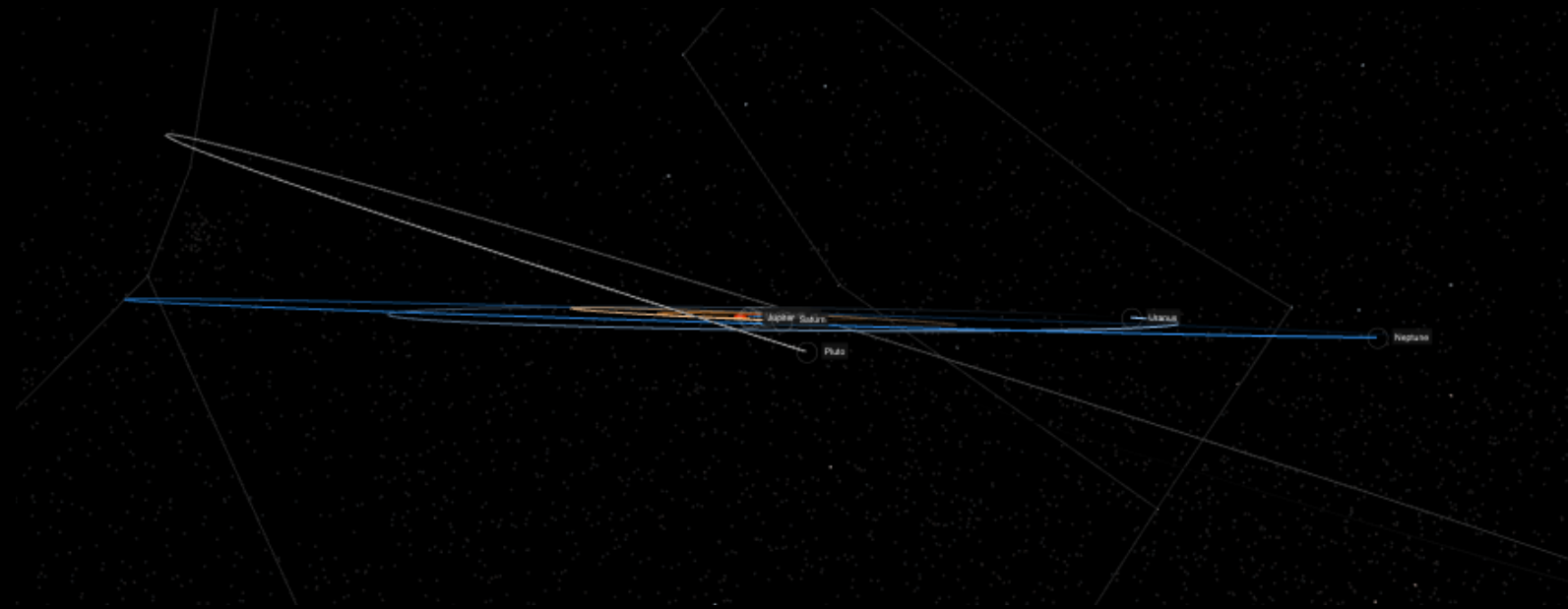
# ORBITS OF THE PLANETS

Orbits are ellipses but appear very circular.



Credit: Martin Vézina  
<http://mgvez.github.io/jsorrery/>

# ECLIPTIC

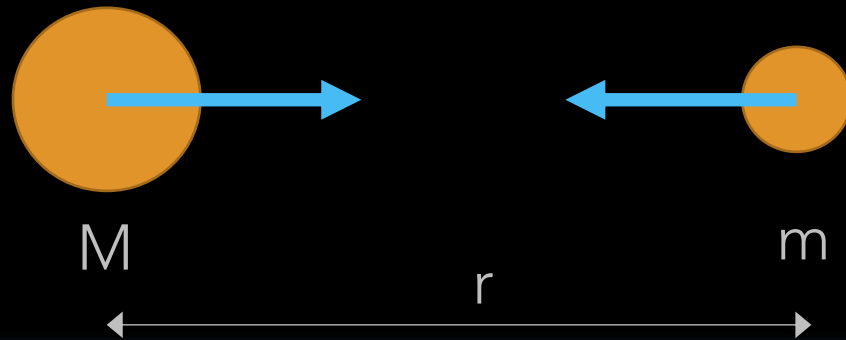


The ecliptic is the plane created by the orbit of the Earth around the Sun. The other planets also orbit in the same plane, within a few degrees (max  $7^\circ$  for Mercury).

# GRAVITY

The gravitational force is what holds objects in orbit around the Sun.

This force depends on the masses of the objects and the distance between them. The force affects both objects.



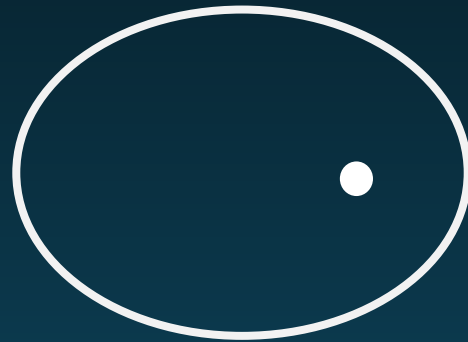
$$F = G \frac{Mm}{r^2}$$

G: gravitational constant

# ORBITS

Orbits are ellipses and not perfect circles.

The Sun is at one of the foci of the ellipse.



# ORBITS

The closer an object is to the Sun, the faster it moves.

- An object closer to the Sun (e.g. Mercury) moves faster than an object further away (e.g. Neptune).
- The speed of an object varies during its orbit since the distance to the Sun varies (ellipse). For example, the Earth moves faster when it is closer to the Sun.