

Nicholas Copernicus proposed an opposing idea to the geocentric model by developing another model that explained the structure of the Solar System. This proposal became the foundation of the Copernican revolution.

In the eighteenth century, the understanding of how the Solar System originated became more than just descriptive models: it became scientific. The following scientific theories present the explanation on the origin of the Solar System. It is important to note that these theories build up on the idea of angular momentum.

°° **Angular momentum** is the quantity of rotation of a body, which is the product of its moment of inertia and its angular velocity.

1. Nebular Hypothesis - **Immanuel Kant** (1724-1804) and **Pierre-Simon Laplace** (1749-1827) were the first to propose the earliest theory of how the Solar System originated.

✓ The **Kant-Laplace nebular hypothesis** presumes that the Solar System began as a cloud of dispersed interstellar gas called **nebula**. The mutual gravitational attraction between particles caused them to start moving and colliding, and they were kept together by electrostatic forces. The resulting nebular aggregates became larger than others, grew more rapidly, and ultimately became the planets.

✓ The Orion Nebula

The Orion nebula situated in the constellation Orion is one of the brightest in the naked eye, and the closest region of massive star formation on Earth. It is composed of dust, hydrogen, and helium, providing a glimpse of the universe's past.

✓ Some 40 years later, **Pierre-Simon Laplace** worked on the existing Kant model, explaining that with the sun already formed, the continuous rotation of the Solar System around an axis would create the planets.

Laplace assumed that the sun cools off as it radiates away its heat, which would also cause its contraction. As the contraction continues, the sun's rotational velocity would increase, following the law of conservation of angular momentum.

✓ The centrifugal force would push materials outward the sun's atmosphere, while gravitational attraction would pull materials toward the central mass. The action of the two forces would create a ring of material within the plane of the sun's equator. This process forms several concentric rings that would eventually form the planets.

2. The planetesimal and tidal theories - **Thomas Chamberlin** and **Forest Ray Moulton** worked on the Kant-Laplace nebular hypothesis, which became the Chamberlin-Moulton planetesimal hypothesis.