

The Universe

Chapter 12

Theories of the Universe

- Big Bang Theory

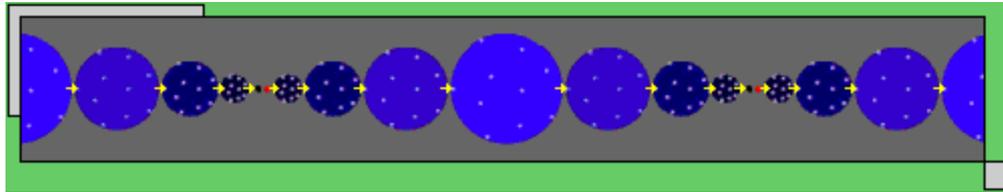
- Most widely supported theory of the universe's formation

- 13.7 billion years ago, an unimaginably tiny volume of space suddenly and rapidly expanded to immense size and continues to expand



Theories of the Universe

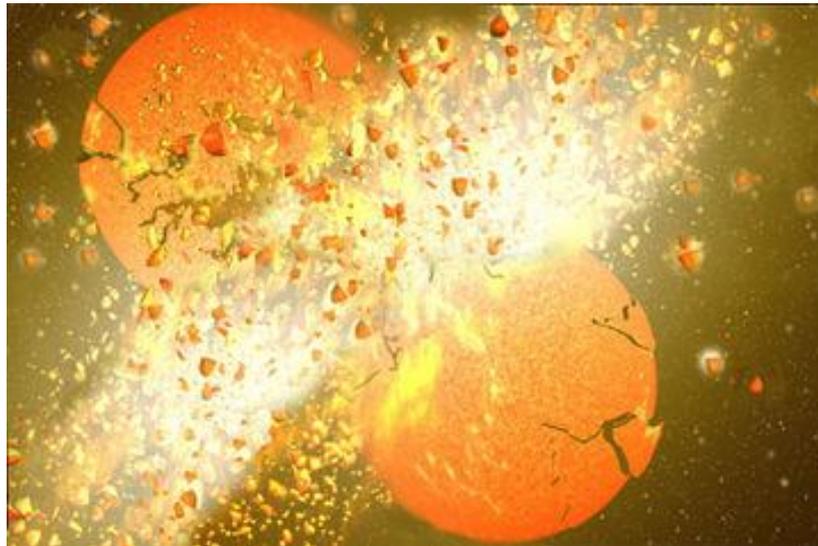
- The Oscillating Theory



- This theory says the expansion of the universe will eventually slow, stop, reverse and all matter will meet again in a **Big Crunch**
- This will be followed by another **Big Bang** and the cycle continues

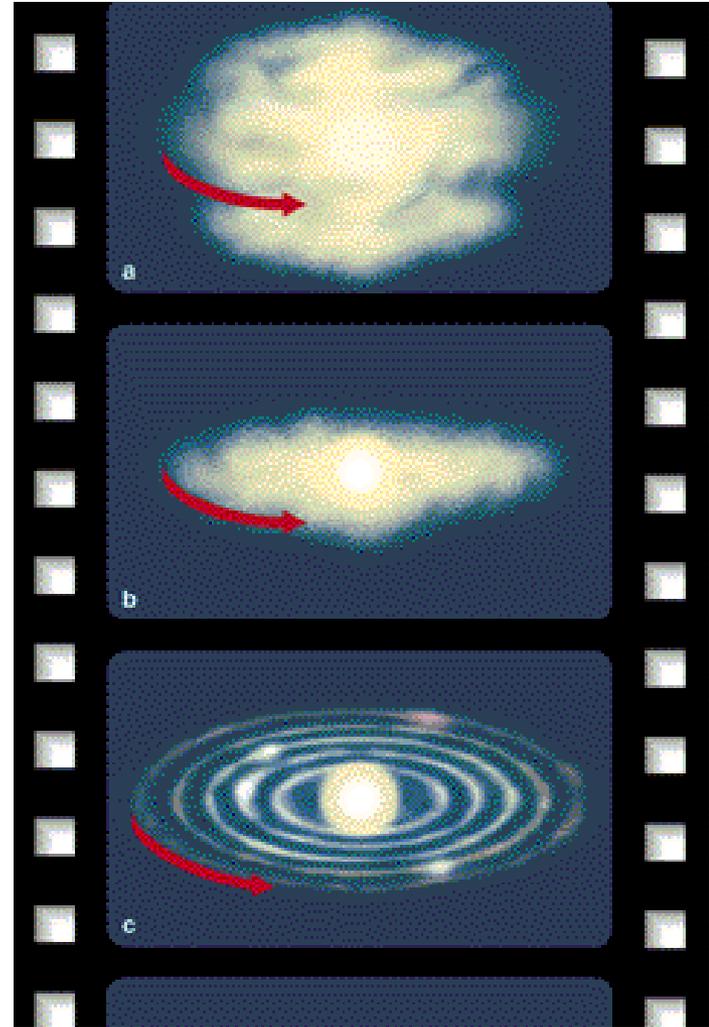
Theories of our Solar System

- Stellar Collision Theory
 - Our solar system is what remains of a collision of two stars
 - We do not believe this is the case anymore



Theories of our Solar System

- Nebular Hypothesis
 - A spinning cloud of dust and gas in space is pulled in by gravity and spins faster
 - Most of the material combines in the middle forming a star
 - Most of the rest of the material collects together in chunks forming planets
 - Some debris is left as asteroids, etc.
 - The closer to the sun, the more densely packed the material becomes (e.g. Venus is dense and rocky, Neptune is made of gas)



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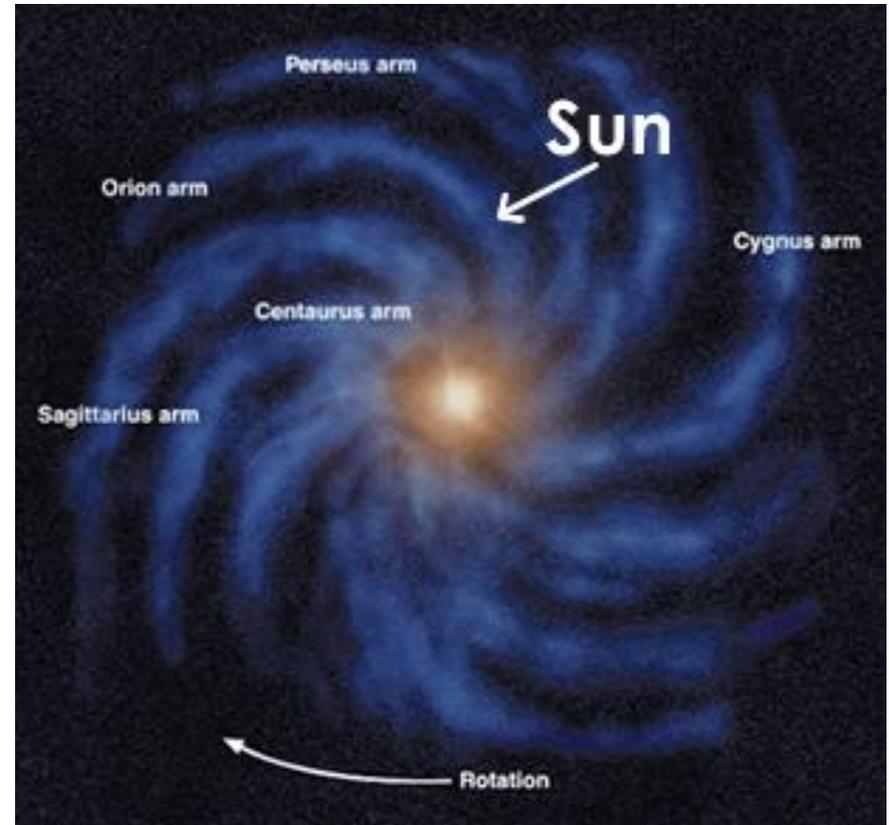
Universe Components

- Nebula
 - Cloud of dust and gas in space
 - Birthplace of stars
 - NGC603 (2.7 million light years from earth)



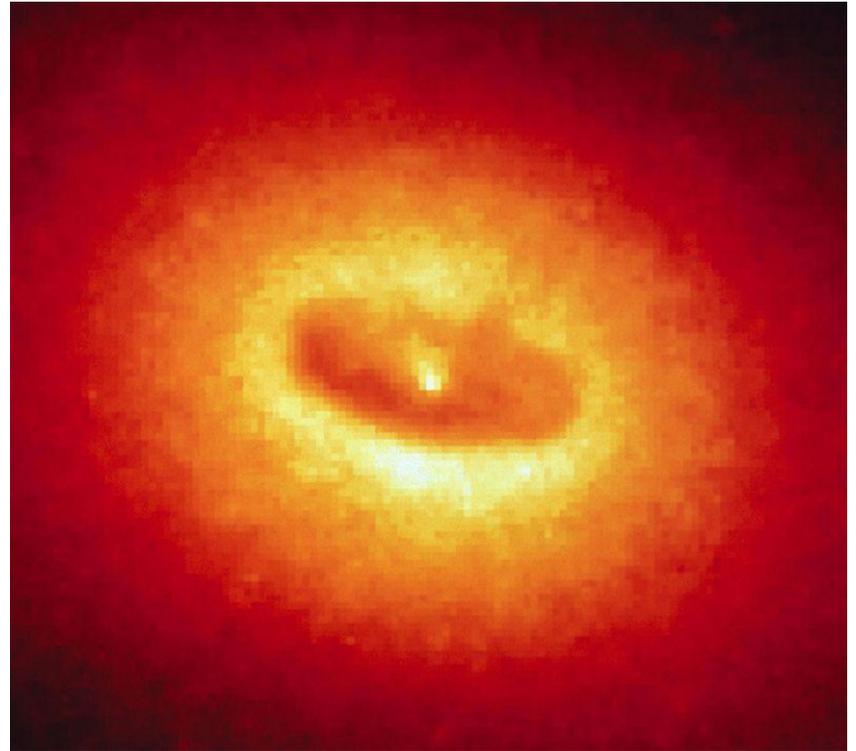
Universe Components

- Spiral Galaxy
 - A galaxy such as our own Milky Way
 - Looks like a pinwheel with long “arms” spiraling out from a centre core
 - Our Solar System is located in one of the arms



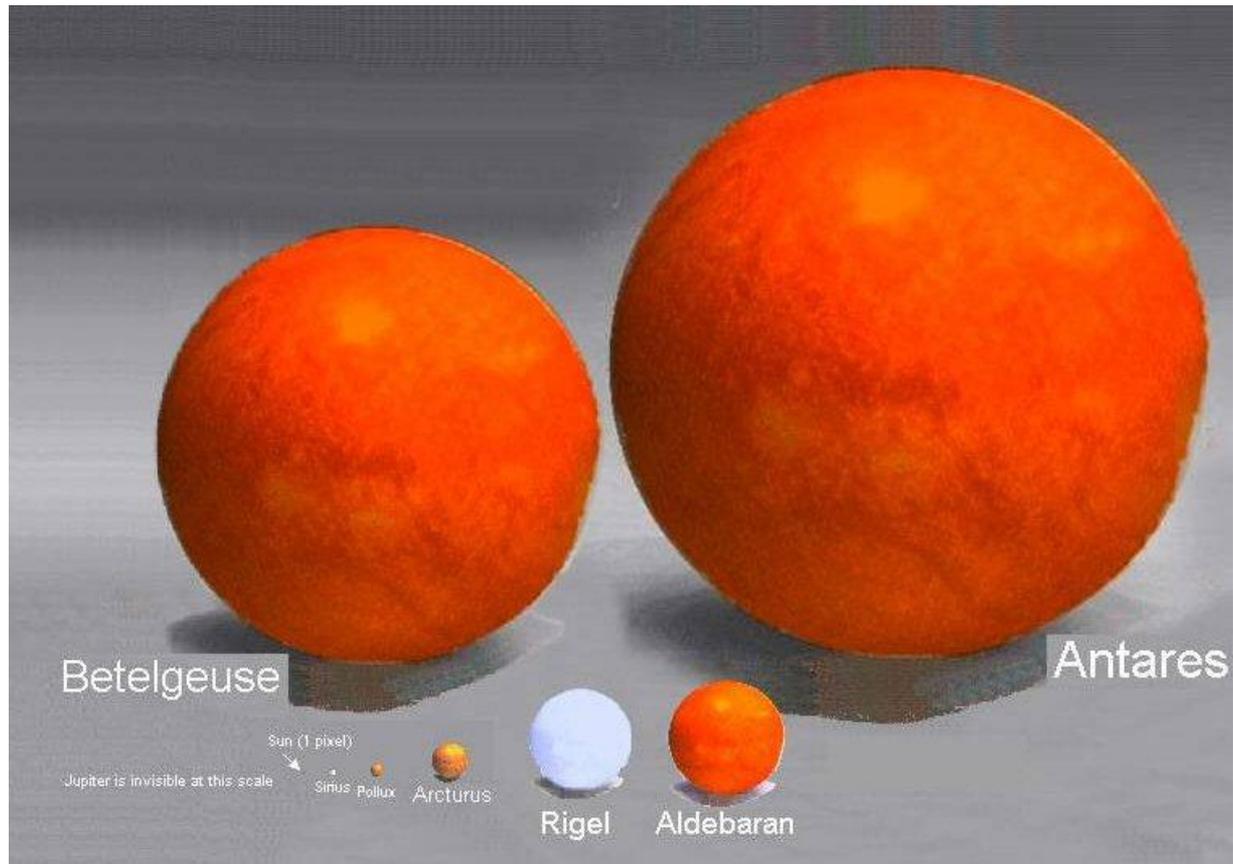
Universe Components

- Elliptical Galaxy
 - Galaxies with shapes such as a perfect sphere, football or cigar
 - Most galaxies are elliptical (including oldest)
 - NGC-4261



Universe Components

- Giant Stars
 - Very large, fast burning stars
 - Will violently collapse in a massive explosion called a supernova after an average of only 7 billion years



Universe Components

- Dwarf Stars
 - Small stars which could be:
 - “Cool” and slow-burning (ex: red dwarf)
 - Hot and quick burning (ex: white dwarf)
 - “very cool” , dense dying star (ex: black dwarf)



Universe Components

- Black Holes
 - When a large star collapses into itself, the extraordinary amount of gravitational pull creates a large sphere of material where nothing, including light can escape



Universe Components

- Quasars
 - When a “supermassive” black hole pulls more and more matter into itself, it develops a surrounding region of extremely high energy called a quasar
 - Quasars are the brightest objects we know of in the universe (mistaken for galaxies)
 - Very old, very far away and poorly understood



... and there's lots more to discover!

