

Formation of celestial body that was caused by the change of electronic states of matter

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Gravitational collapse of interstellar gas and condensation of cosmic dusts has been investigated [1]. But, electron-electron interactions increase by the increase of mass of celestial body. The change of electronic state increases bonding force. Large celestial body can become the core for gravitational collapse of hydrogen gas.

Coulomb force that binds neighboring atoms in vicinity of 10^{-10} m is about 10^{36} times powerful of gravitational force. Cold nanoparticles of interstellar medium can be clustered by the electron-electron interaction. Molecules of water contributed to growth of the cluster. The percentage of effect of short-range force on a cluster comprised of larger solid elements is decreased.

The gravity increases cumulatively with increase of mass regardless of the points of chemical bond. If planet becomes larger than 2.0×10^9 kg, gravitational force of planet is more than short-range force. Large planetesimal captures small planetesimal by the gravity. Huge mass of celestial body can hold the hydrogen. Temperature of interior of planet become high by the gravitational potential energy. Coulomb force and gravitational force work concurrently. Long period of growth is necessary in the early stages for the growth due to short-range force. While, gravitational collapse of interstellar gas is progressed in a short time due to existence of the gas of about 100 times mass of cosmic dust. The Sun is not the first generation of stars. The protostar of the Sun was growing before gravitational collapse of gas. There is metallic electronic state of hydrogen outside of core. The nuclear fusion begins at hydrogen layer. Radioactive substances contained in meteorite indicates that those were born from solid core by explosion due to nuclear fusion.

Please see more information at Website; “<https://youtu.be/GMmvjU2CdKM>” ,
“<https://youtu.be/HwBjqYpDdu0>” .

[References]

[1] Black, D. C. & Matthews, M. S., eds., “Protostars & Planets II” , The Univ. of Arizona Press, (1985).

Keywords: protostar, cosmic dust, intermolecular bond, short-range force, gravitational collapse, nuclear fusion