# Accretional evolution of the dust particles and planetesimals in the sun's proplid

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**Introduction:** The innumerable small particles aggregate into smaller numbers of big bodies. Small grains of dust are aggregating into planetesimals. Planets grew by collisional aggregation these objects.

**Formation of the planetesimals:** However, as bodies of approximately m-size would emerge from this, collision velocities with smaller bodies could search 50 m/s or more depending on the structure of the disk. [1,2] When the planetesimals collided to fast (about 40-50 m/s) they broke each other apart. The experiments show that the fast colliding bodies not growth. Planetesimals can form in a very dense layer of dust grains that undergoes a collective gravitional instability in the midplane of a protoplanetary disk. Many planetesimals may eventually break apart during violent collisions, but a few of the planetesimals can survive such encounters and countinue to grow into planetesimals and later planets.

It is widely believed that planets – at least terrestial planets – from trough collisions of km- sized planetesimals in a protoplanetary disks[1]. It is not yet settled though how these planetesimals from. The standard modell assumes that they form through collisions of smaller bodies from micron sized dust particles all the way up to planetesimals.

The big question in planet formation is how dust grains grow from intersellar sized – about 10-100 nanometers – to planetesimals or larger bodies. This is the important problem of planetesimal formation.

**Helper effect of the accretion of bodies:** Astronomers (STS cl, UC Berkeley) peering into the dust surrounding a nearby red dwarf star (AU Mic) have found that the dust grains have a fluffines comparable to that powder snow( proportion of the grain's porosity more than 90 percent). This is the first definitive measurement of the porosity of dust outside our solar system, and is akin to looking back 4,57 billion years into the early days our planetary system.

In present days the objects in our solar system, also are porous: comet nuclei build up ice, dust and rock they are like the nest's structure. The some asteroids have been shown to be half empty rubble piles, but none are as full of nothingness as the dust in AU Mic, which is more than 90 percent vacuum.

**Conclusion:** The porous structure can be swalloved the collision's force. If so the collided bodies are enough porous, then these can be easily stick together. We can see that this process can provide excellent explanation that how are planetesimals built.

**References**

[1] Weidenshilling S. J. and Cuzzi J. W. (1993) pp III,1031-1060.

[2] Sekiya M. and Tokeda H. (2003) Earth Planets Space, 55, 263-269.