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## Growth of Dust Particles under the Effect of Fragmentation

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I studied growth process of dust particles in protoplanetary disk. The coagulation equation taking into account the effect of dust fragmentation is solved. For the particles smaller than 1m, the collision velocity between particles increases as the particles grow, and when the collision velocity becomes so high that particles begin to fragment, further particle growth is completely suppressed. Thus, in order for the dust particles grow to planetesimal size, the collision velocity must be always smaller than the critical velocity for fragmentation. If fragmentation is effective, micron sized particles are created as fragment from the larger particles that have already settled at the midplane. Thus, micron sized particles also have a spatial distribution peaked at the midplane.

Keywords: protoplanetary disks, dust, planetesimals