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Dust Growth in Protoplanetary Disks

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Dust growth by aggregation is an important process as the first step of planet formation in protoplanetary disks. Dust growth also influences radial migration of solid components and the temperature structure in protoplanetary disks. However, we still have a large uncertainty in dust growth process. This uncertainty is mainly originated from unknown factors in the structure of growing dust aggregates and their collisional outcomes. It is still unclear what kind of structure dust aggregates have during their growth and how small impact velocity is required for their collisional sticking without major fragmentation. Furthermore, the collisional outcomes would be strongly dependent on the aggregate structure (the porosity, the number of connections among particles in the aggregate, etc.). In recent years, many theoretical studies on aggregate collisions have been done. In this talk, I will introduce remarkable results in these studies, mainly focusing on results by our group.

Keywords: grain aggregate, proto-planetary disk, dust, planet formation