P140-022 **Room: 304** **Time: May 19 9:45-10:00**

Dust Aggregate Collisions: Sticking, Bouncing, and Disruption

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Coagulation and fragmentation processes of dust aggregates by their mutual collisions in protoplanetary disks are important to understand planetesimal formation. Recently, we have performed numerical simulations of aggregate collisions using two kinds of aggregates of submicrometer-sized spheres: ballistic cluster-cluster aggregataion (BCCA) clusters and ballistic particle-cluster aggregation (BPCA) clusters. BCCA clusters are fluffy (fractal dimension D ˜2) and BPCA clusters are relatively compact (D ˜3). As a result, we find that BCCA clusters compressed at collisions still remain fluffy with D ˜2.5 and BPCA clusters consisting of ice particles are able to grow at collision velocities up to several 10 m/s. These results support a scenario that very fluffy planetesimals are formed through collisions of dust aggregates in protoplanetary disks.

However, several experimental studies report that low-velocity collisions for silicate aggregates often induce rebound of two colliding aggregates, while such colliding aggregates always result in sticking or disruption in the previous numerical studies. This ‘bouncing’ problem is critical for dust growth and planetesimal formation through collisions of dust, because bouncing would prevent dust aggregates from sticking with each other. We expect that the rebound is caused by the difficulty of restructuring of aggregates that is determined by the number of contacts in the aggregates. That is, if constituent particles in aggregates are in contact with many neighbor particles, they cannot freely roll on the neighbors and thus energy cannot dissipates enough for the aggregates to stick with each other. In this study, we perform numerical simulations of collisions between aggregates with various numbers of contacts and discuss the bouncing conditions of aggregates and the feasibility of dust growth by collisions.