Mass Distributions of Remnants for Collisional Fragmentation of Dust Aggregates

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We investigated fundamental processes of collisional sticking and fragmentation of dust aggregates by carrying out N-body simulations of submicron-sized icy dust monomers. We examined the distribution of the number of dust monomers constituting remnants. We fitted the results of the numerical simulations and modeled the distributions of the remnant mass as functions of the collision velocity and the mass ratio between colliders. The mass distributions of the largest and the second-largest remnants are represented by two or three power-law functions, and the number of kinds of the power laws depends on the mass ratio. The boundary between two and three power laws may be related to the mass transfer from a larger dust aggregate to a smaller one. On the other hand, the cumulative mass distribution of small remnants do not well depend on the mass ratio.

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