Size evolution of sintered dust aggregates in protoplanetary disks

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Observation by ALMA showed that there was a concentric dust ring around HL Tau.
Okuzumi et al. (2016) attempted to explain the existence of the ring by sintering dust aggregates.
In the previous work, only growth of the maximum size aggregates were calculated.
And other aggregates assumed power-law distribution.
However, when computing brightness temperature, the effect of small dust can not be ignored.
Therefore, we aim at simulating the size distribution evolution of aggregates to confirm the accuracy of the assumed distribution.
In this study, sintered aggregates would bounce after the collision if the collision velocity of aggregates is higher than 20m/s.
In the previous study, focusing on the time (t = 0.26 Myr) used for comparison with ALMA observation data, we compare power-law distribution with the result of numerical simulation. As a result of the simulation, it was found that the distribution which was used in the previous study shows that the brightness temperature has a maximum value about 3.6 times larger than the result of numerical simulation at t = 0.26 Myr. So, in order to make a quantitative comparison with radio observation, simulation of size distribution evolution is necessary.

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