

Evolution of Grain Size Distribution in the Interstellar Medium

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The evolution of grain size distribution in the interstellar medium (ISM) is important to specify the “initial condition” of the grain growth in protoplanetary disks. We calculate the evolution of grain size distribution in the ISM by considering the dust production from stars and the subsequent processing of dust in the ISM. In particular, we find that shattering by the grain–grain collisions driven by interstellar turbulence is efficient enough to modify the grain size distribution. We also predict the evolution of extinction curve based on the grain size distribution. An example of our calculations¹ is shown in Fig. 1. We also mention the effects of other mechanisms that potentially affect the grain size distribution (coagulation, accretion, shock destruction, etc.).

Keywords: interstellar dust; grain size distribution; extinction curve.

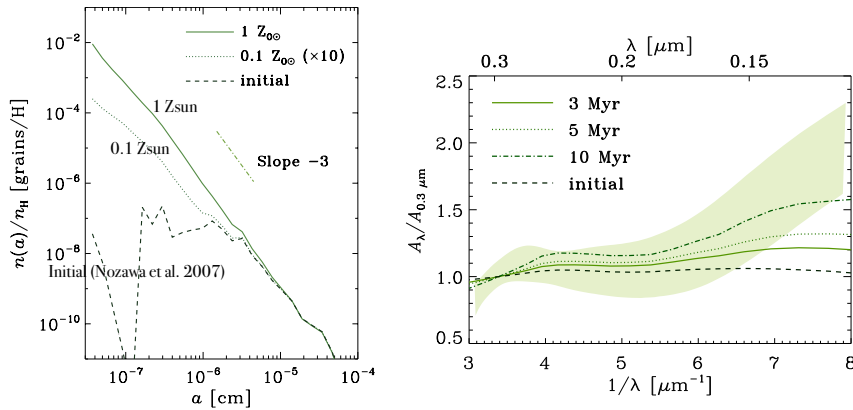


Figure 1. Examples of our calculations.¹ *Left:* The size distribution of dust produced by supernovae² is modified by shattering in interstellar turbulence (duration = 5 Myr). The grain abundance is scaled with the metallicity (we show the results for 1 and 0.1 solar metallicity). *Right:* Time evolution of extinction curve by shattering in interstellar turbulence.

References

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- [2] T. Nozawa *et al.*, *Mon. Not. R. Astron. Soc.* **666**, 955 (2011).