

## **Dust-regulated galaxy formation and evolution**

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I will discuss how interstellar dust influences galaxy formation and evolution processes based on the results of my new chemodynamical simulations with dust physics (Bekki, K., 2015, ApJ, 799, 166; Bekki, K., 2015, MNRAS, 449, 1625). The galaxy-scale simulations include, for the first time, various dust-related physical processes in interstellar medium (ISM), such as photoelectric heating, H<sub>2</sub> formation on dust, and stellar radiation pressure on dust. A novel point of the simulations is that different dust species in a galaxy are represented by 'live dust' particles (i.e., not test particles). Therefore, dust particles in a galaxy not only interact gravitationally with all four components of the galaxy (i.e., dark matter, stars, gas, and dust) but also are grown and destroyed through physical processes of ISM. The preliminary results are as follows. The evolution of dust distributions driven by radiation pressure of stars is very important for the evolution of star formation rates, chemical abundances, H<sub>2</sub> fractions, and gas distributions in galaxies. The evolution of silicate and carbonaceous dust is quite different (e.g., in the evolution of their spatial distributions) in galaxies, if these dust grains are under strong radiation pressure of the stars. The radial distributions of dust can be significantly influenced both by galaxy-scale dynamics and by radiation pressure in disk galaxies. I will discuss several key implications of these results in the context of galaxy formation and evolution and the origin of pre-solar grains.