Contribution ID: **82** Type: **Poster**

Cosmological simulation with dust evolution

Monday 11 June 2018 17:13 (1 minute)

Dust enrichment is one of the most important aspects in galaxy evolution.
The evolution of dust is tightly coupled with the nonlinear evolution of
the ISM including star formation and stellar feedback,
which drive the chemical enrichment in a galaxy.
Hydrodynamical simulation provides a powerful approach
to studies of such nonlinear processes.

In this work, we perform a smoothed particle hydrodynamic simulation
with a dust enrichment model in a cosmological volume.
We adopt the dust evolution model that represents the grain size distribution
by two sizes and takes into account stellar dust production and interstellar
dust processing. We show that our cosmological simulation allows us to examine
the dust mass function and to analyze the dust abundance and dust properties
in galaxies statistically. The simulation broadly reproduces the observed
dust mass functions at redshifts $z \sim 0$ and 2.5 and the relation between
dust-to-gas ratio and metallicity shows a good agreement with the observed
one at $z = 0$, which indicate a successful implementation of dust evolution
in our cosmological simulation. Besides, we also examine the redshift evolution
up to $z \sim 5$, and find that the galaxies have the highest dust abundance at $z =$ 1-2.
For the grain size distribution, we find that galaxies with metallicity $\sim 0.3\ Z_{\odot}$
have the highest small-to-large grain abundance ratio at $z < 5$;
consequently, the extinction curves in those galaxies have the steepest
ultra-violet slopes.

Consider for a poster?

Yes

Primary author: HOU, kuan-chou (ASIAA)

Co-authors: Dr HIRASHITA, Hiroyuki (ASIAA); Dr SHIMIZU, Ikkoh (Osaka University); Prof. NAGAMINE, Kentaro (Osaka University); Dr AOYAMA, Shohei (ASIAA)

Presenter: HOU, kuan-chou (ASIAA)

Session Classification: Poster Presentations

Track Classification: The creation and evolution of dust