



Contribution ID: 41

Type: **Poster**

The Spatially Resolved Dust-to-Metals Ratio in M101

Monday 11 June 2018 10:47 (1 minute)

The dust-to-metals ratio provides insights into the life cycle of dust. We measure the dust-to-metals ratio in M101, a nearby galaxy with a radial metallicity gradient spanning ~ 1 dex. We fit the dust spectral energy distribution (SED) from 100 to 500 μm with five variants of the modified blackbody (MBB) dust emission model (free β , fixed β , broken emissivity, warm dust component, and a power-law radiation field distribution). The broken emissivity method performs the best among them, showing small residuals, reasonable $\tilde{\chi}^2$ distribution, a temperature gradient decreasing with radius and no violation of the upper bounds on available metals. We show that the dust-to-metals ratio is not constant in M101, but decreases as a function of radius, leading to a lower fraction of the heavy elements being trapped in dust at low metallicity. We show that the dust-to-gas ratio (DGR) is proportional to $Z^{1.71}$. Alternatively, we could instead explain the DGR gradient as an increase in emissivity as dust grains coagulate. If we assume the Draine et al. 2014 dust-to-metals relation, the opacity constant κ_{160} would increase at most by a factor of two, which is similar to what Planck Collaboration et al. 2014 found.

Consider for a poster?

Yes

Authors: Mr CHIANG, I-Da (University of California, San Diego); Dr SANDSTROM, Karin (University of California, San Diego); CHASTENET, Jeremy (UCSD); Prof. LEROY, Adam (The Ohio State University); UTOMO, Dyas (The Ohio State University)

Presenter: Mr CHIANG, I-Da (University of California, San Diego)

Session Classification: Poster Presentations

Track Classification: The creation and evolution of dust