A Submillimeter Survey of Dust Continuum Emission in Local Dust-Obscured Galaxies

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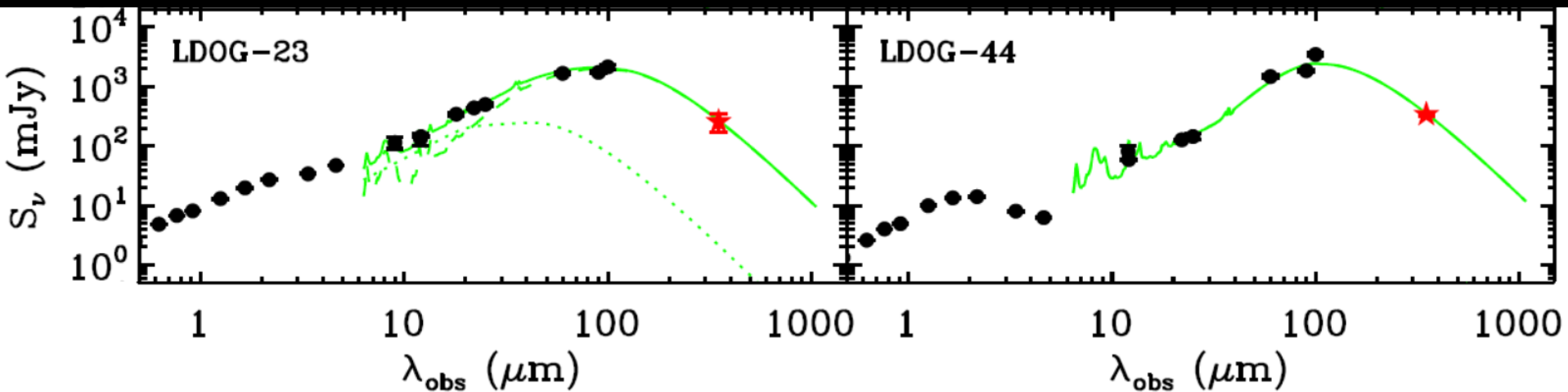**Ho Seong Hwang**
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Intro: Dust Obscured Galaxies

Dusty star-forming galaxy at z~2 are selected with R-[24] > 14 (Dey+08)
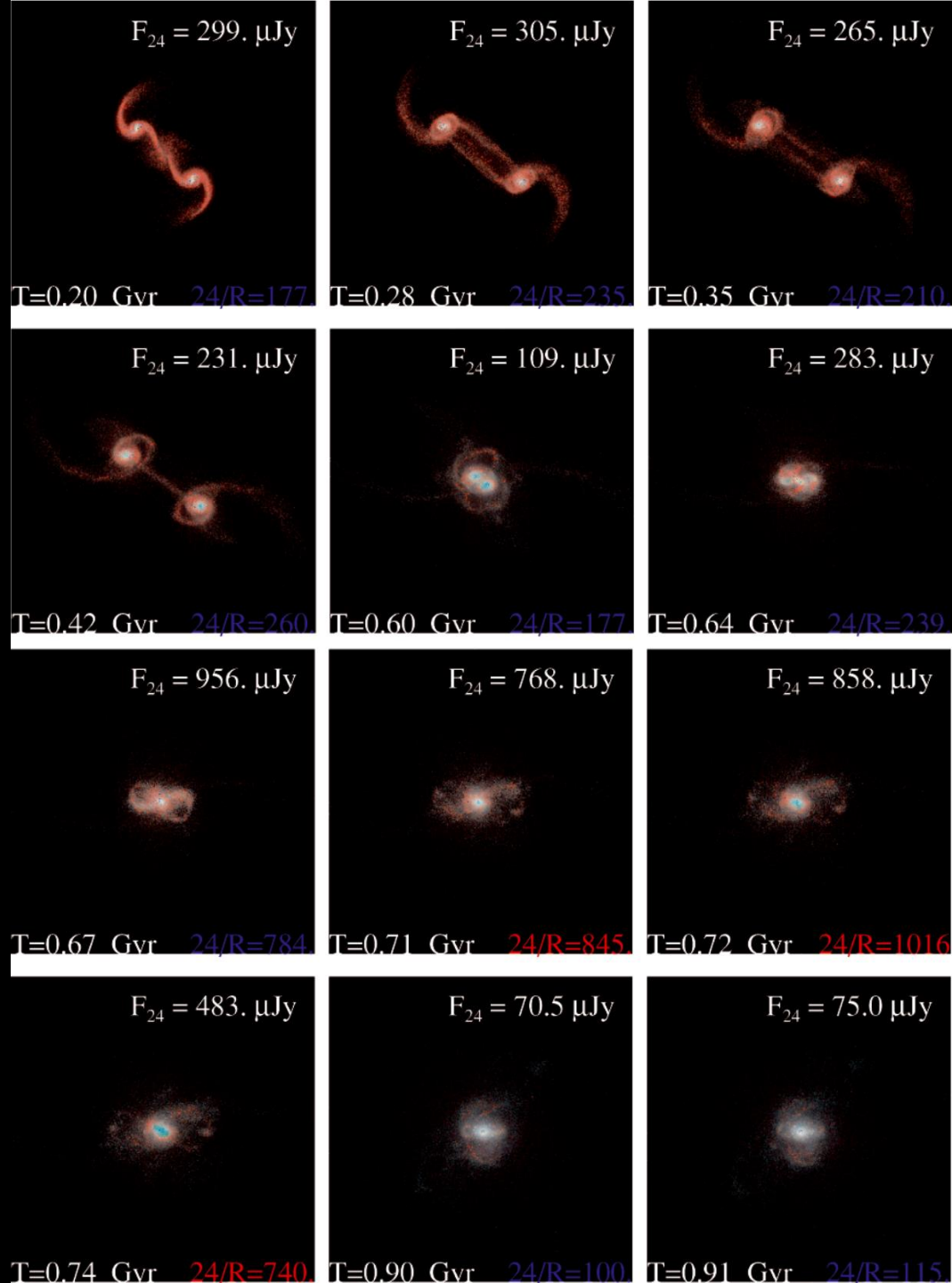Most luminous galaxies in Universe are found as Hot DOGs (Assef+15)

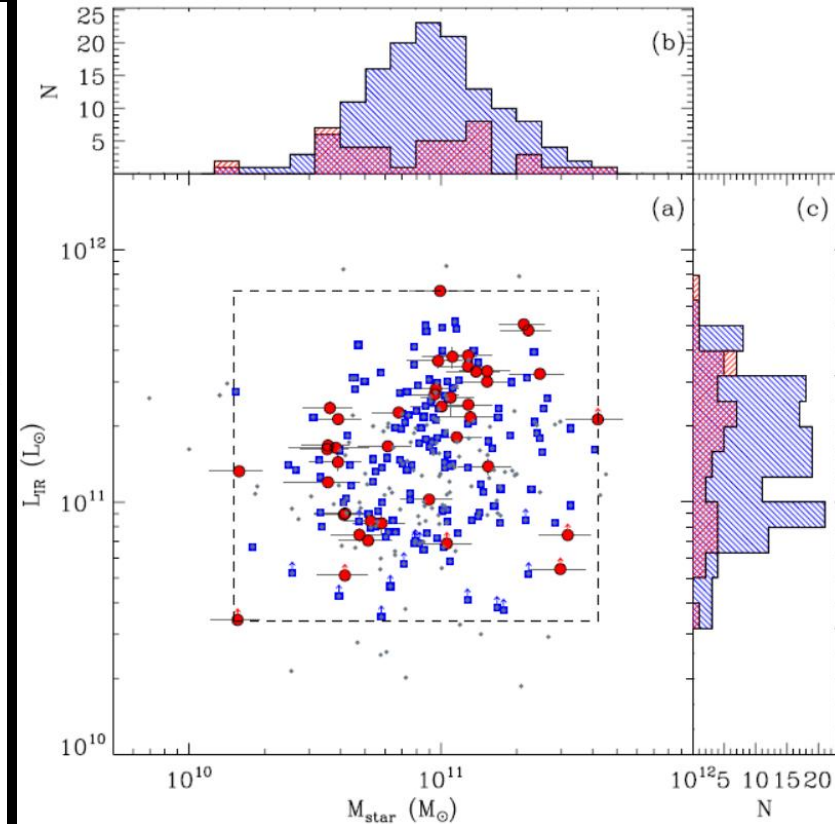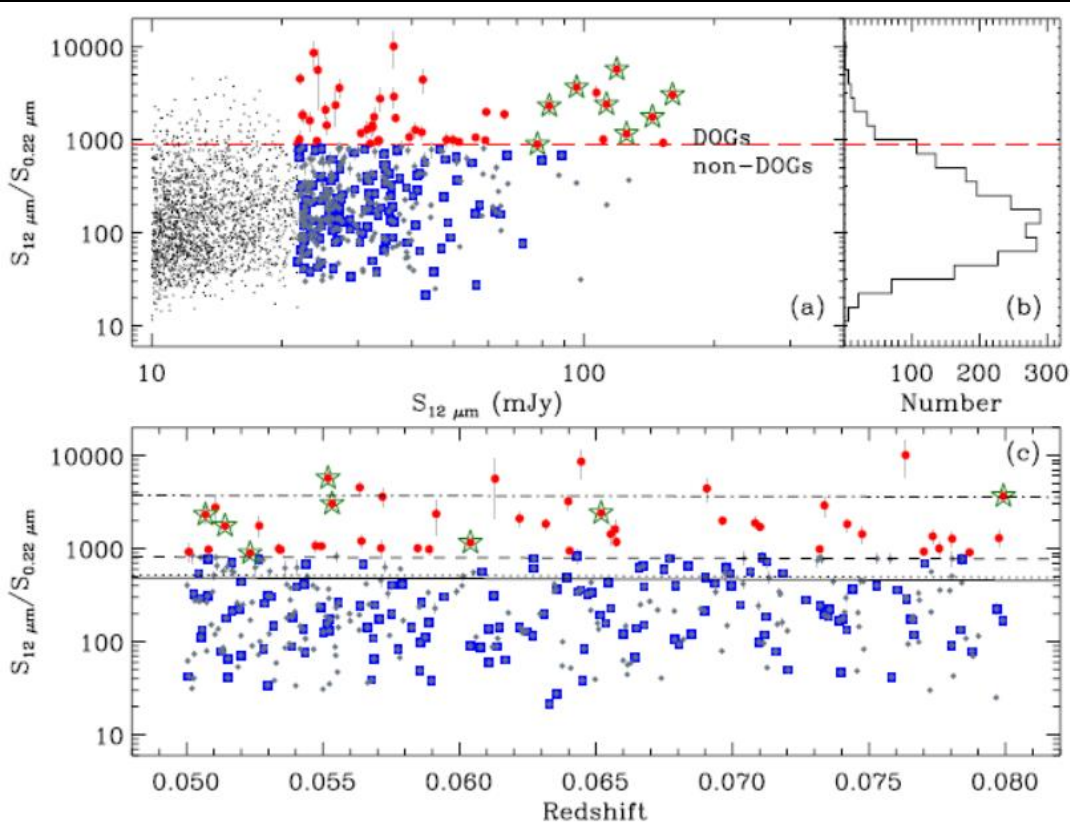(AGN-dominated) power-law DOG   (SF-dominated) bump DOG

Intro: DOGs

Gas-rich major merger simulation
(Narayanan+10)

Intro: local DOGs (Hwang+13)
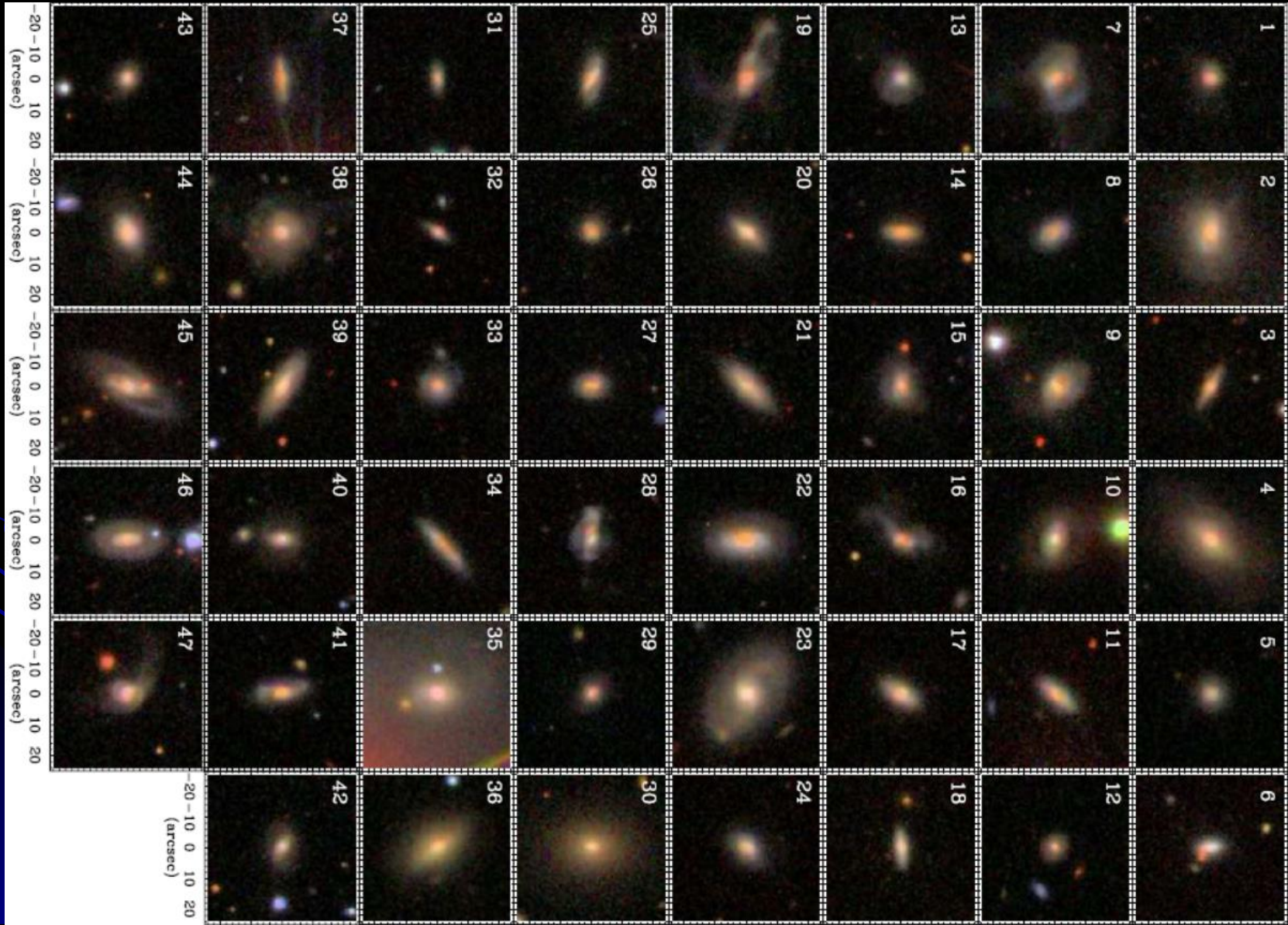
Search for local analogs using GALEX/SDSS/WISE

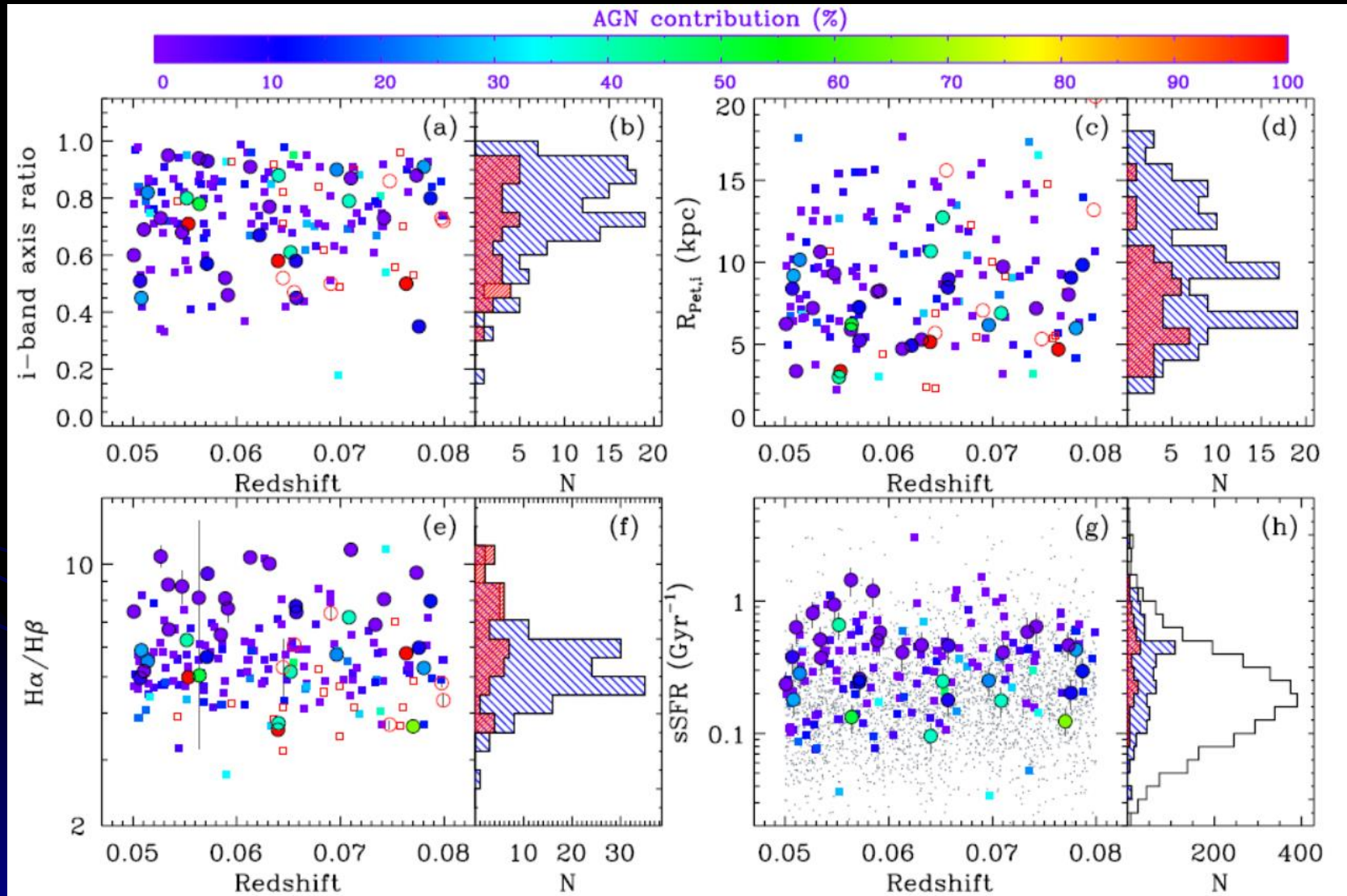$\rightarrow$ 47 local DOGs with $S_{12}/S_{0.22} > 892$

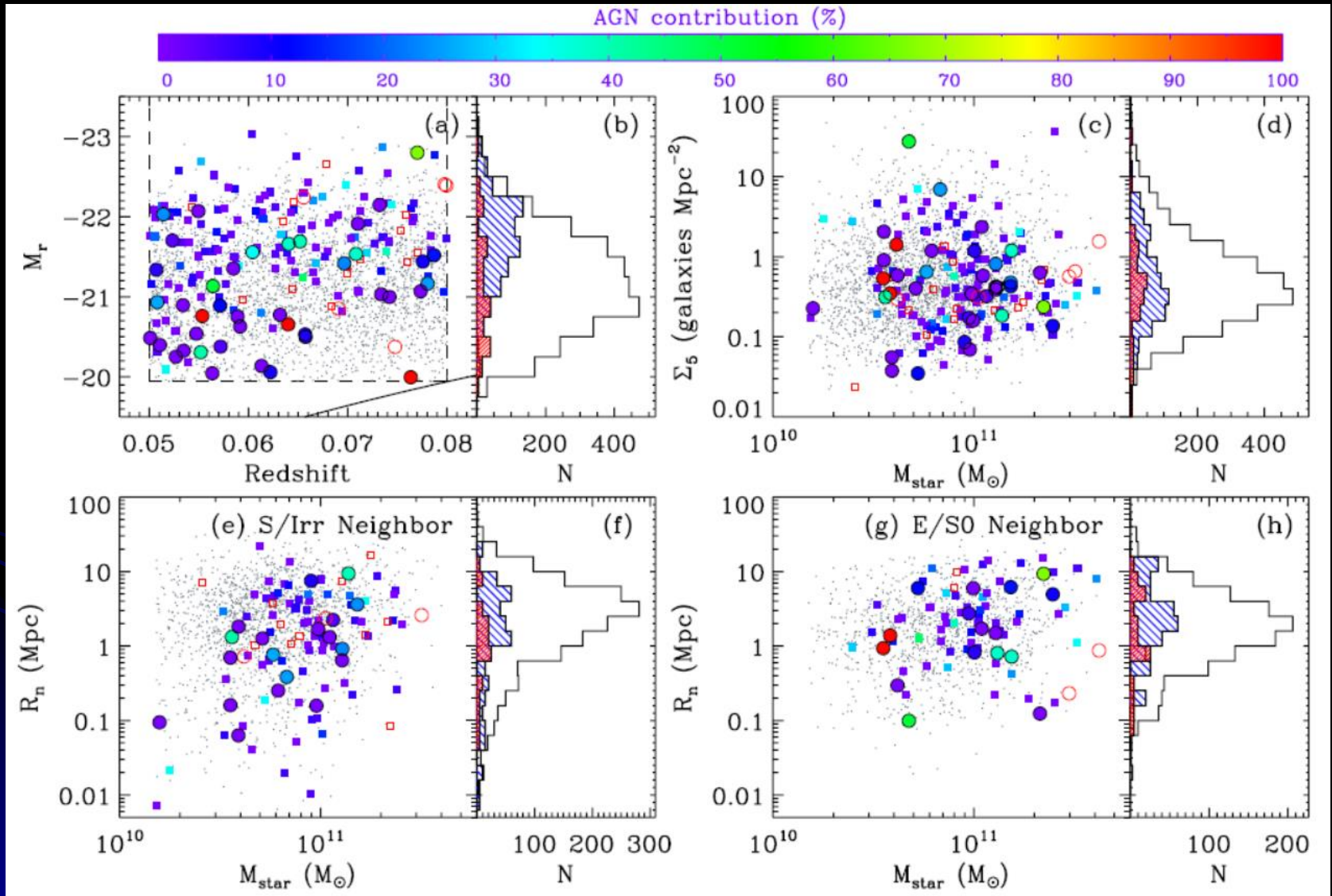# Intro: local DOGs (Hwang+13)

SDSS color stamps
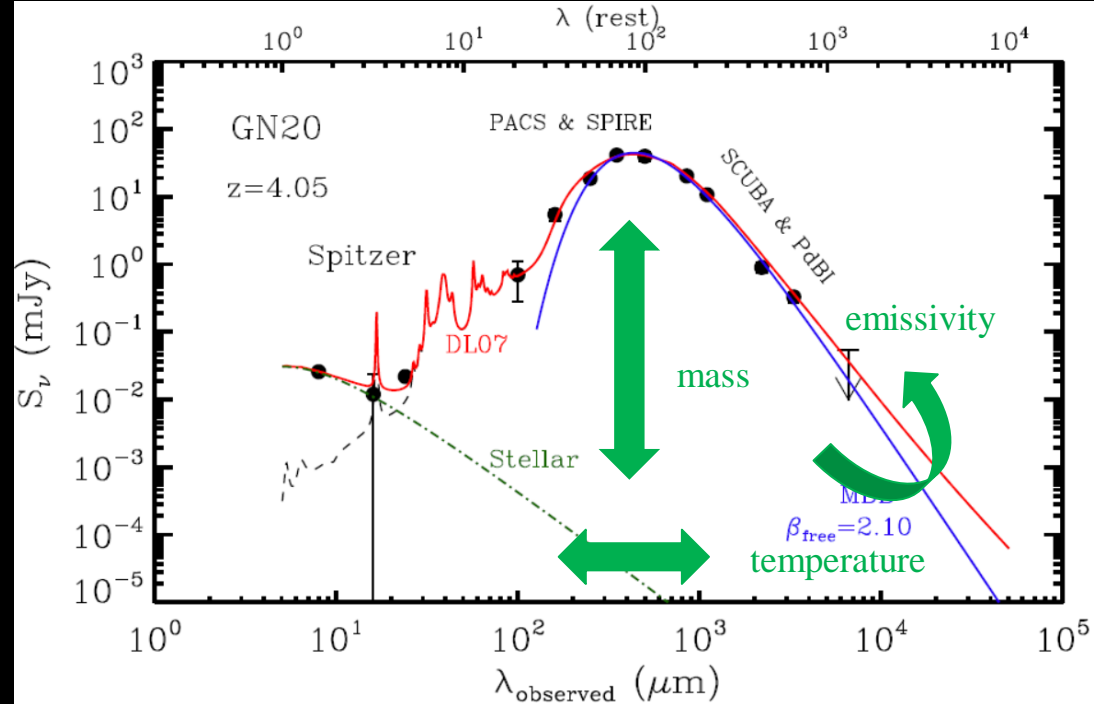
Intro: local DOGs (Hwang+13)

Local DOGs have small axis ratio, but not enough to explain their extreme obscuration.
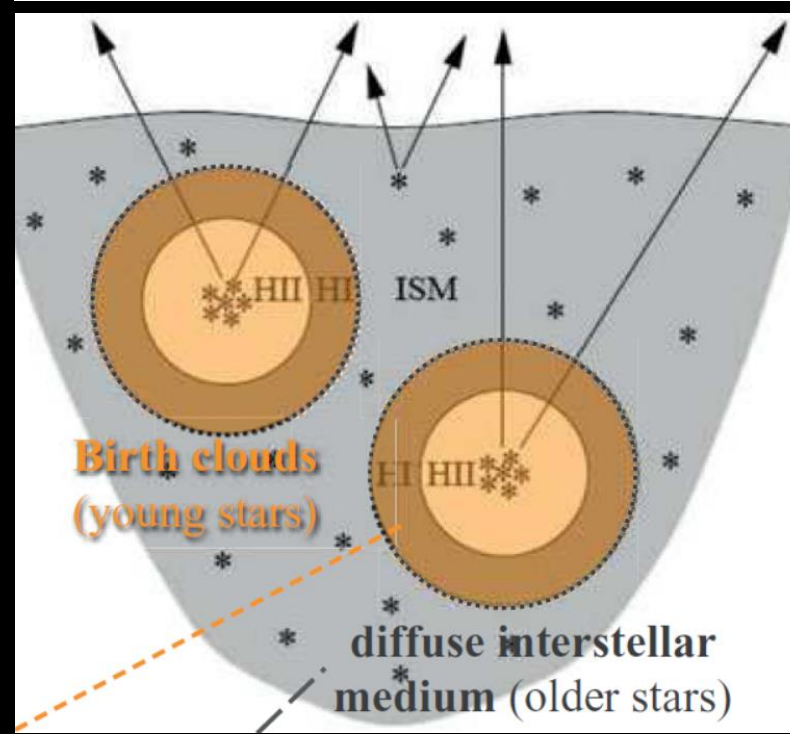
Intro: local DOGs (Hwang+13)

The environments of local DOGs are similar to the control sample.
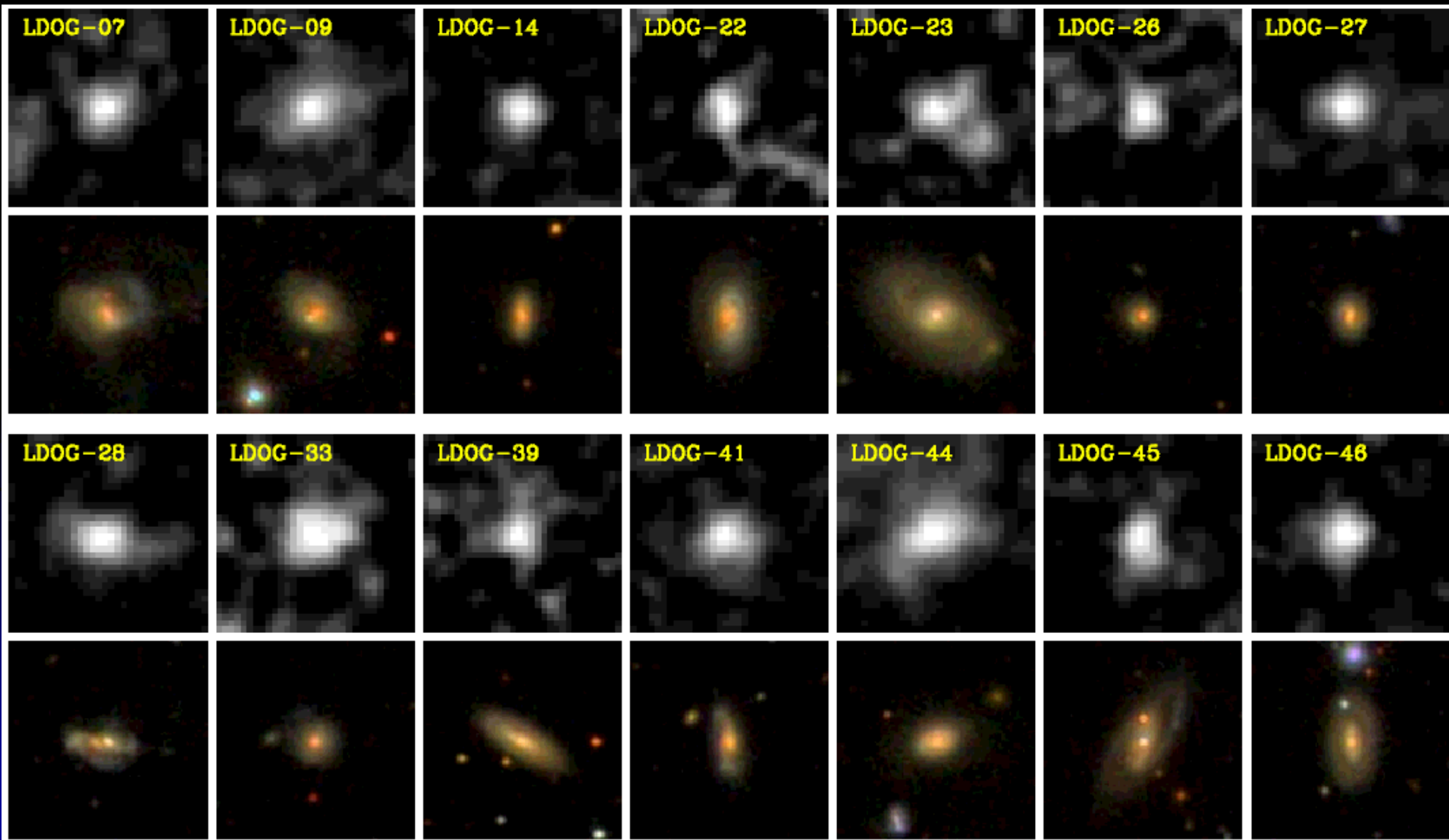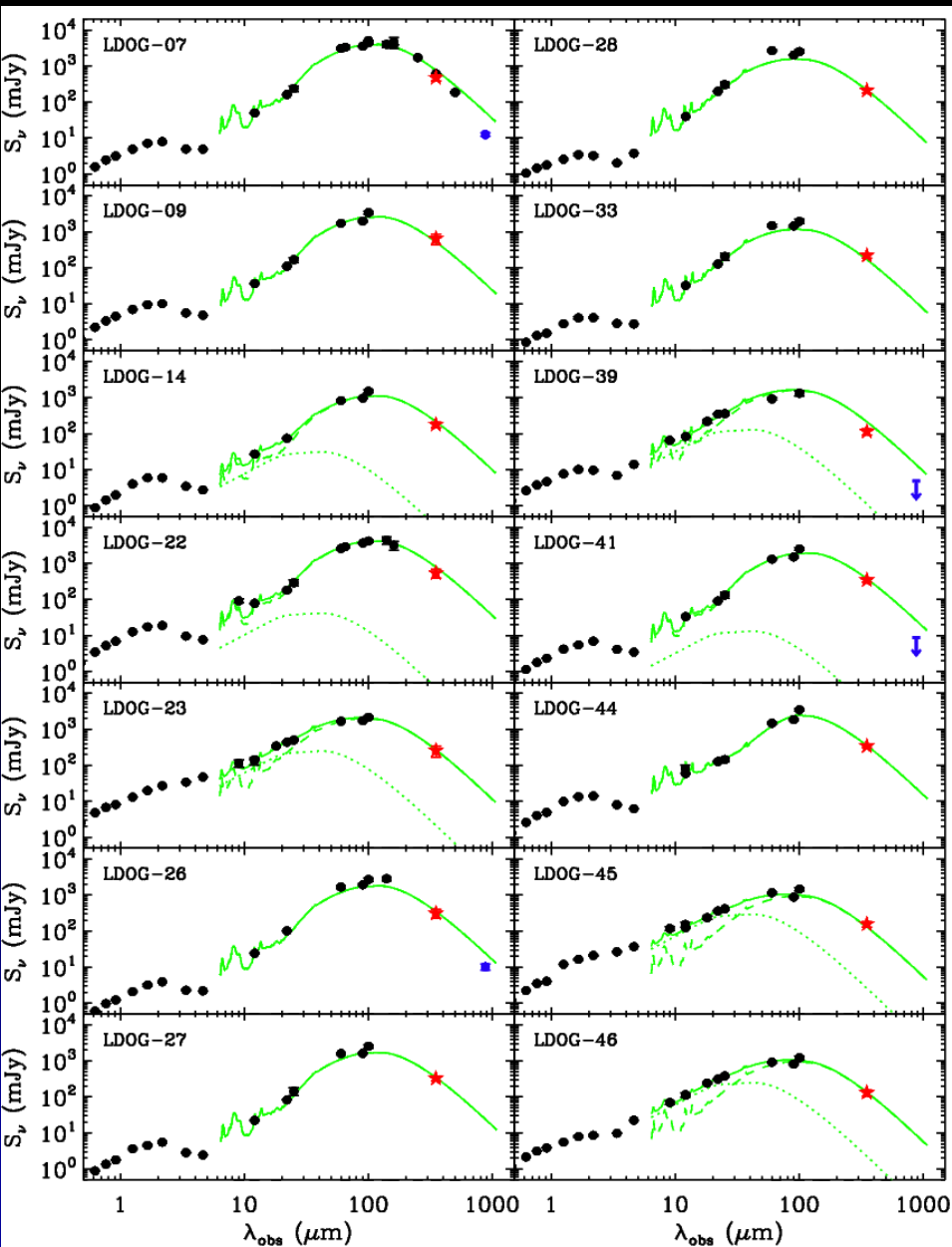
Intro: Dust models

Magdis+11

da Cunha+12

Sample & Observation:
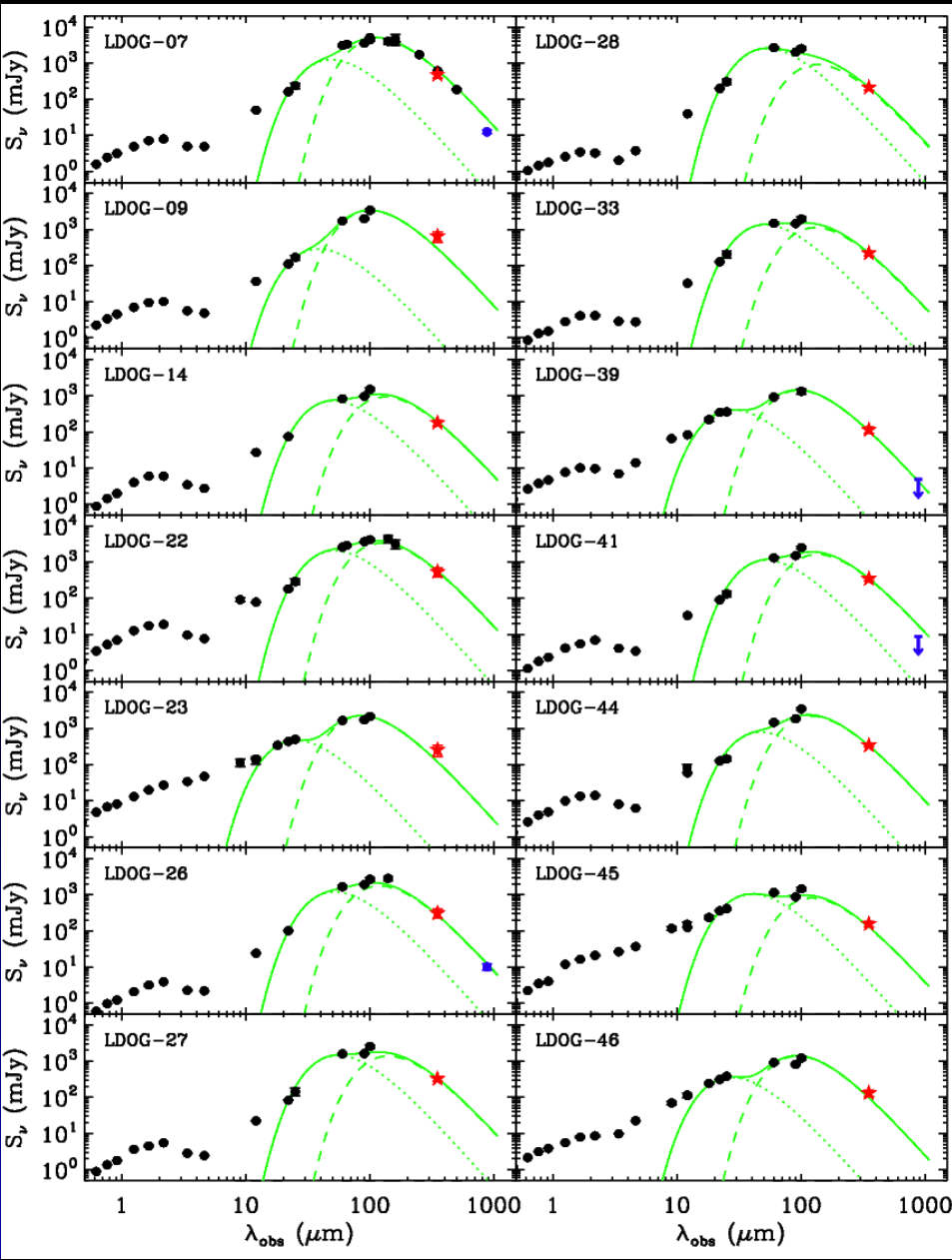## CSO 350 micron images for 14 local DOGs

Analysis: SED fit for infrared luminosity & AGN contribution

DECOMPIR routine (Mullaney+11)
AGN + 5 host galaxy templates

Analysis: SED fit for dust temperature & mass

Two-component dust model

cold dust: ambient diffuse interstellar medium
warm dust: embedded stellar birth clouds

assuming modified blackbody functions
with emissivity index $\beta=2$
        dust opacity coefficient $k_\nu=0.383$ cm^2 g^{-1}

$$S_\nu = A_w \nu^\beta B_\nu(T_{\text{warm}}) + A_c \nu^\beta B_\nu(T_{\text{cold}})$$

$$M_{\text{dust}} = M_{\text{warm}} + M_{\text{cold}} = \frac{D_L^2 \; \nu^\beta}{k_\nu}(A_w + A_c)$$

Result: Comparison with normal galaxies
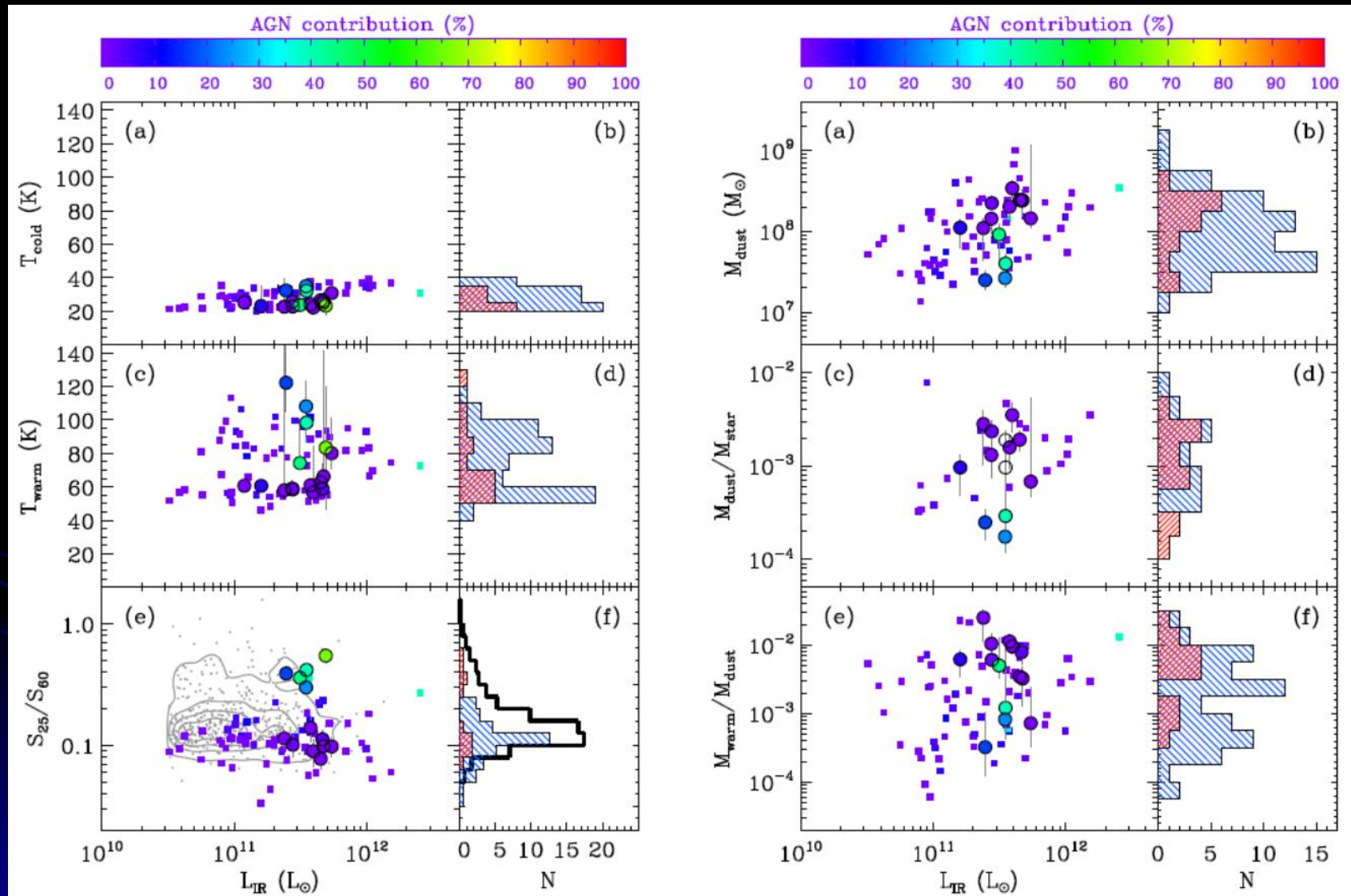
The significant difference (>2σ) is found only in the distribution of warm dust fraction.

Summary & Discussion

▪ We report CSO observations of the submm dust continuum emission for 14 DOGs in the local universe. Including additional two local DOGs with submm data from the literature, we derive their dust masses and temperatures based on a two-component modified blackbody function.

▪ The comparison of local DOGs with normal infrared luminous galaxies with submm detection shows that the dust temperatures and masses do not differ significantly among these objects. However, there are some hints that local DOGs have a relatively large amount of warm dust.

▪ We suspect that the extreme dust obscuration in DOGs is mainly related with a dust geometry rather than an amount of dust. We have plans to investigate the CO line information with JCMT observation (16A) and inspect the archival imaging data for a very nearby sample.