Morphology of local Luminous InfraRed Galaxies (LIRGs)

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ULIRG

$10^{12} L_{\odot}$

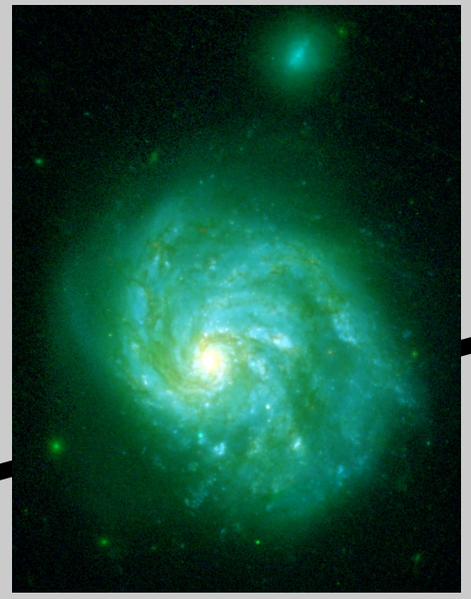
LIRG

$10^{11} L_{\odot}$

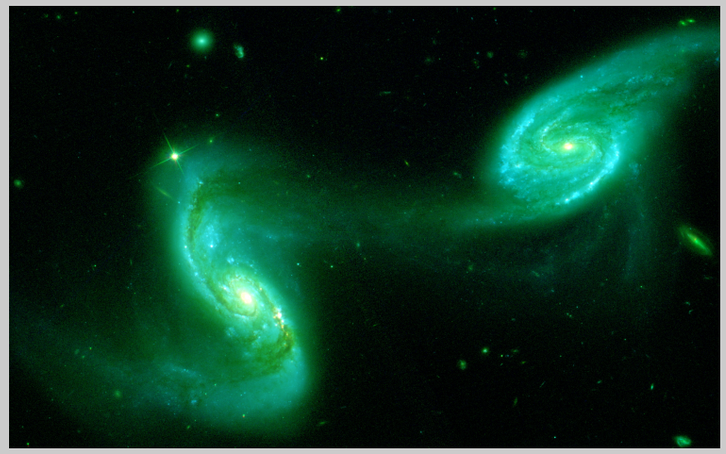
sub-LIRG

L_{IR} (dust heating)

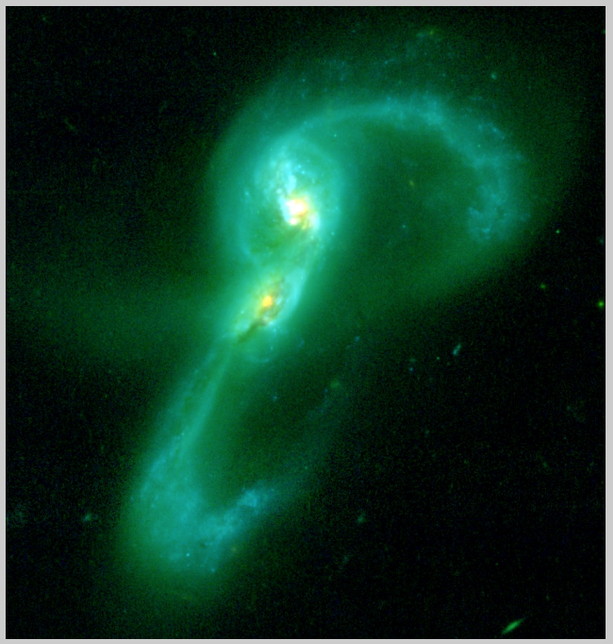
isolated



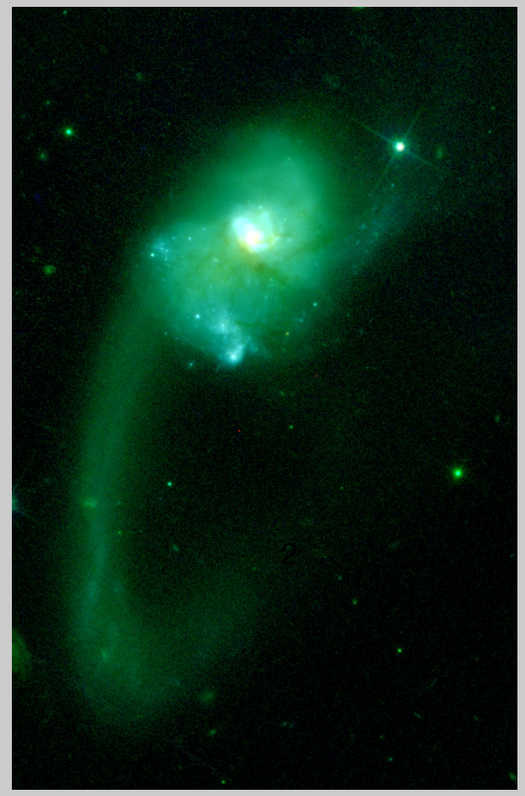
pre-merger



ongoing-merger



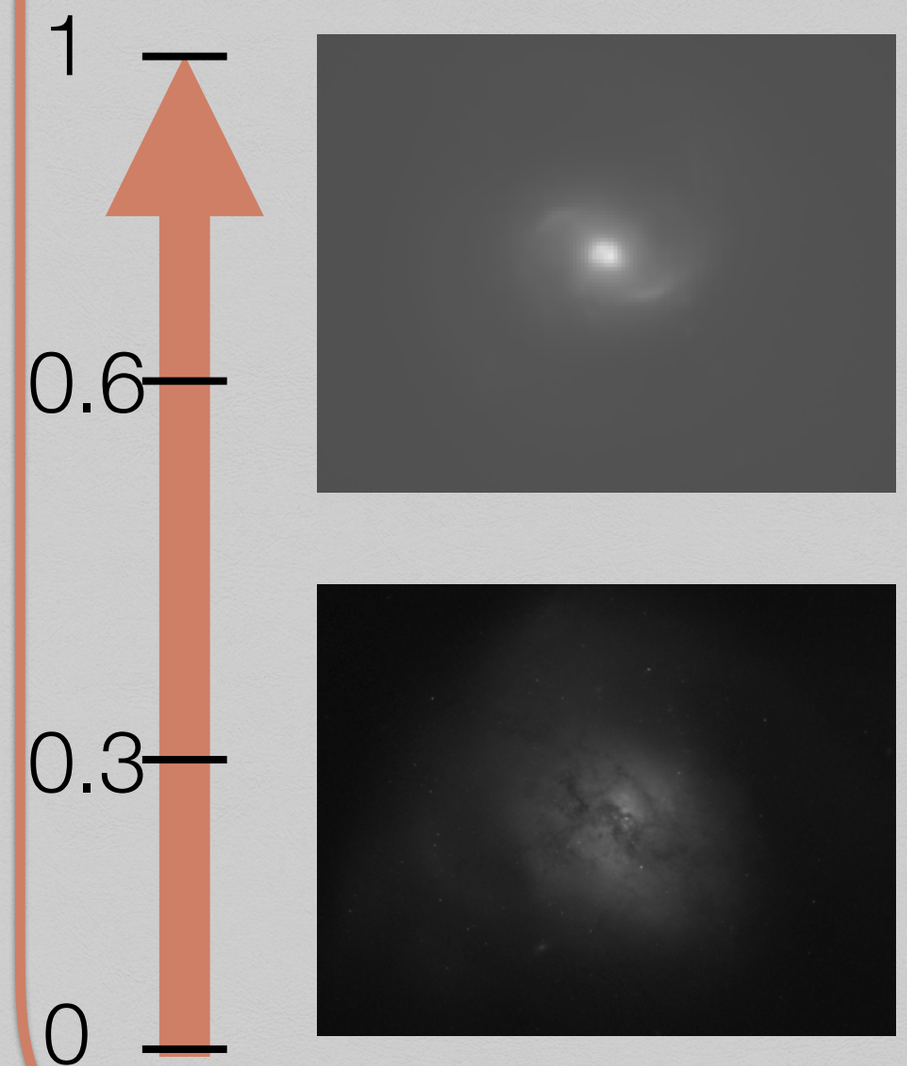
post-merger



Interpreting non-parametric coefficients

Gini

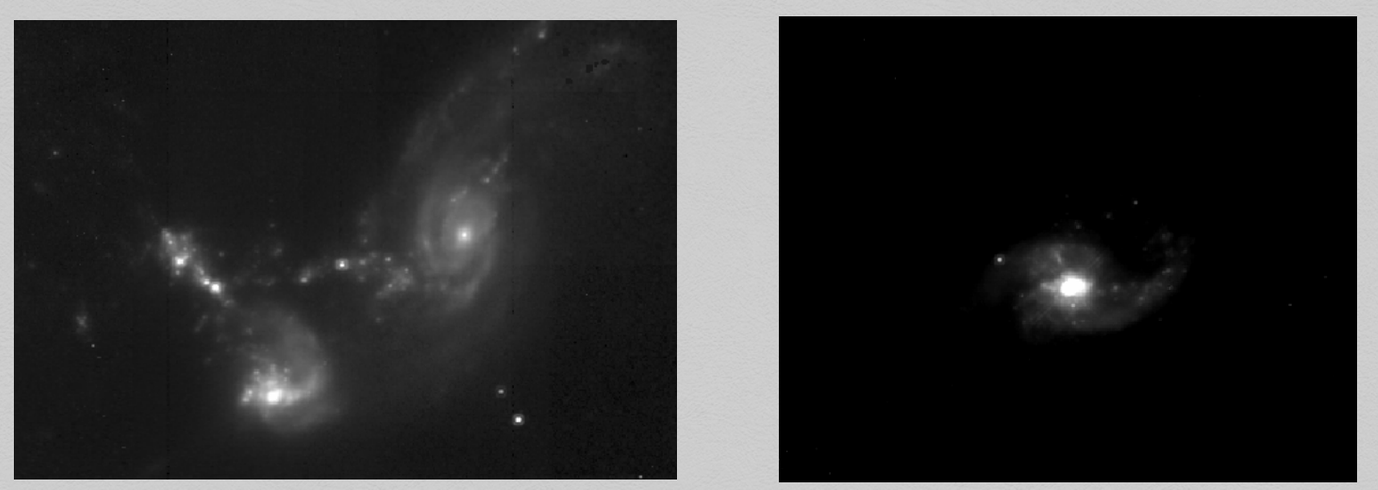
indicates the relative distribution of galaxy pixels



M_{20}

$M_{20}=\log(\Sigma M_i/M_{total})$, where $M_i=f_i[(x_i-x_c)^2+(y_i-y_c)^2]$

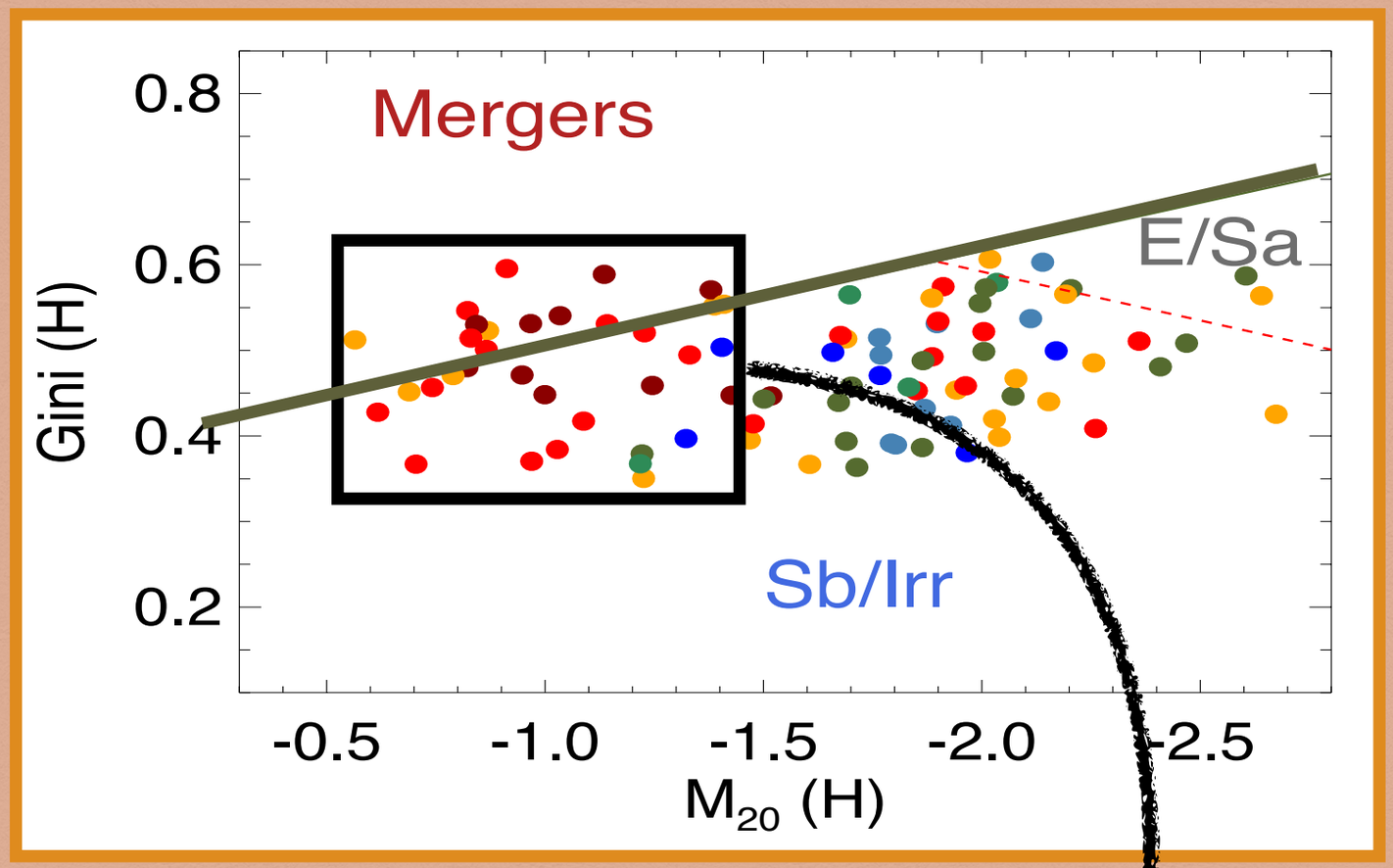
traces the spatial distribution of any bright region



Gini - M_{20} plane in H-band

more flux in fewer pixels

smooth distribution



spatially extended

compact

H-band

nuclei, K stars,
not affected by dust

pre mergers

- undisturbed isolated galaxies
- distinguishable galaxies disks

on-going mergers

- separate galaxies, symmetric disks
- two nuclei in common envelope
- double nuclei plus tidal tail

post mergers

- single or obscured nucleus with long tails
- single nucleus with central morphology

They lie inside the left part of Gini-M_{20} plane regardless of the band.

Morphology and sSFR

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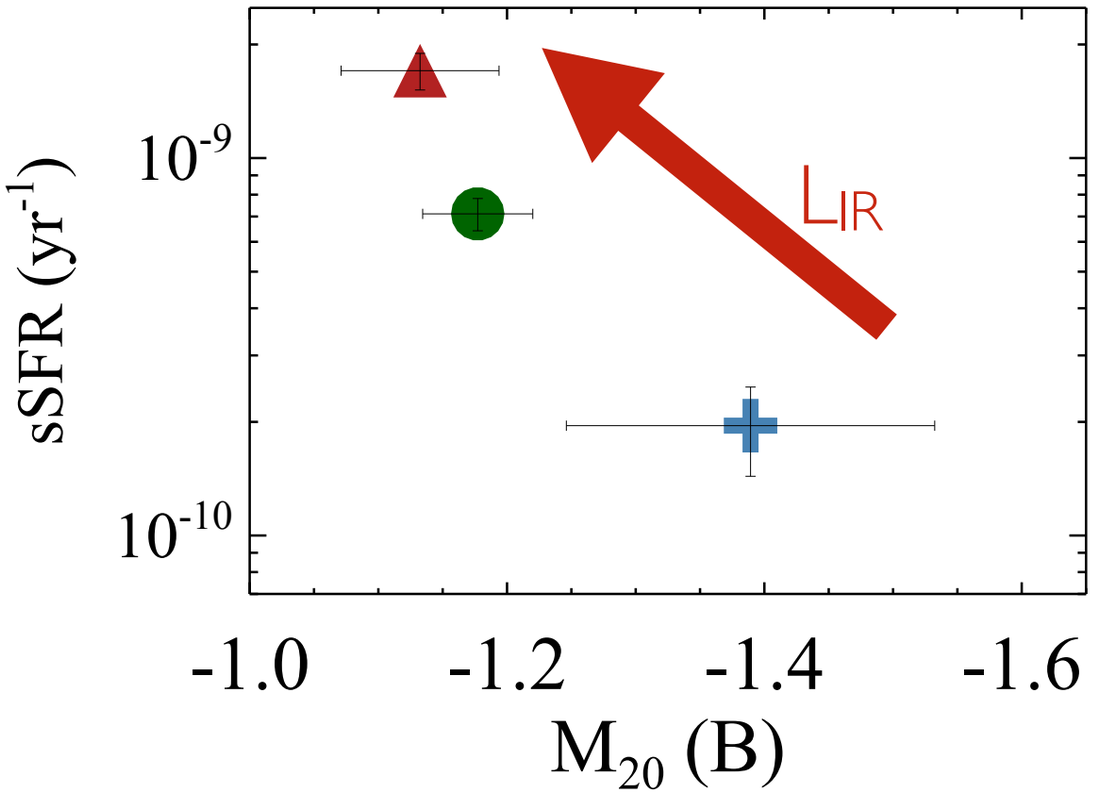
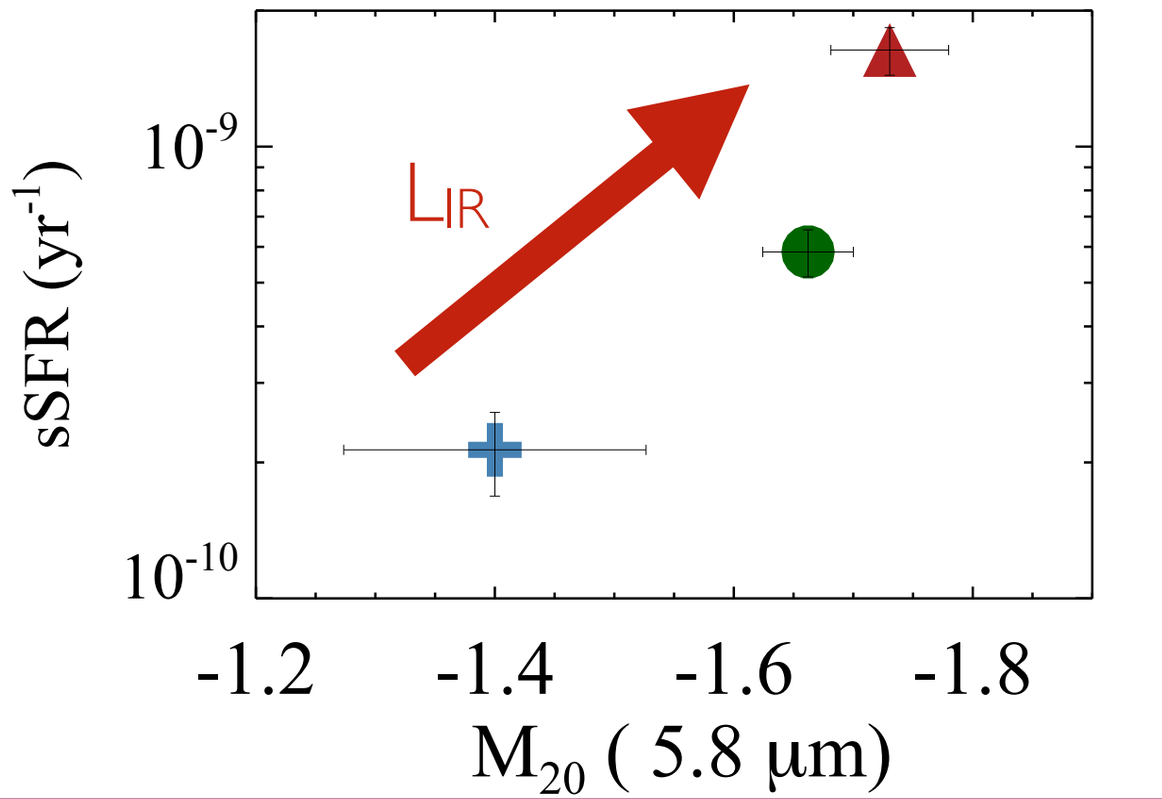
sSFR = SFR / M★ (instantaneous SFR)

B-band



5.8 μm



▲ ULIRGs

● LIRGs

✚ sub-LIRGs

ULIRGs & LIRGs (highest sSFR) appeared extended in the B-band in contrast to MIR where they are more compact than the sub-LIRGs.

- The physical size of dusty galaxies, (U)LIRGs measured in optical, are highly dependent on the geometry of dust distribution and can be significantly overestimated.