



ENVIRONMENT DEPENDENCE OF DWARF GALAXY MORPHOLOGY

H. B. Ann Pusan National University

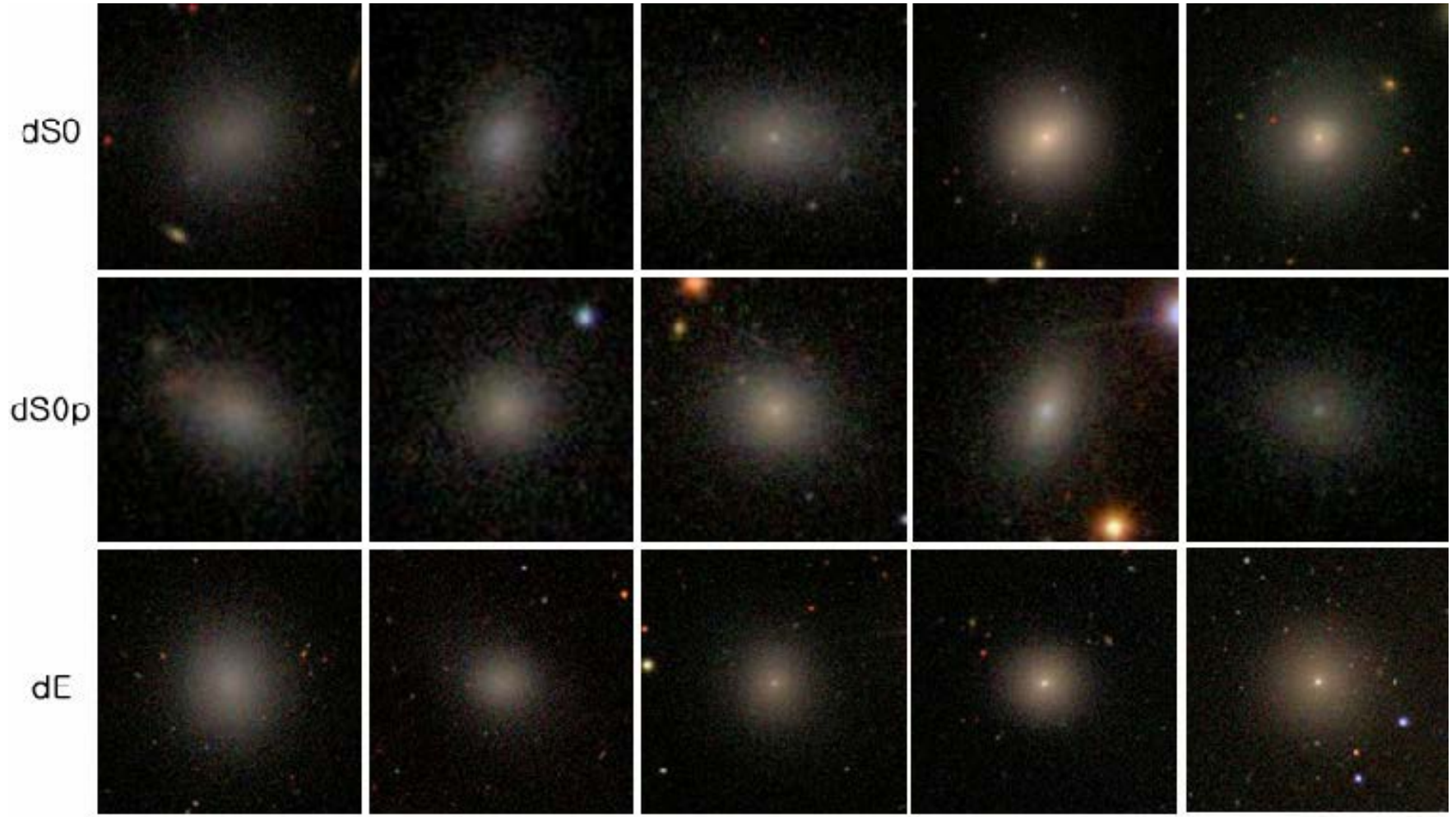
- **Why dwarfs in group environment?**
- More than 80% of dwarf galaxies are members of galaxy groups in the local universe ($z < 0.01$).
- Spatial distribution of dwarf galaxies in groups and satellite systems may provide some clues to understanding the origins of dwarfs
- Morphologies of dwarf galaxies are not simple.

dwarf elliptical-like galaxies: 5 subtypes

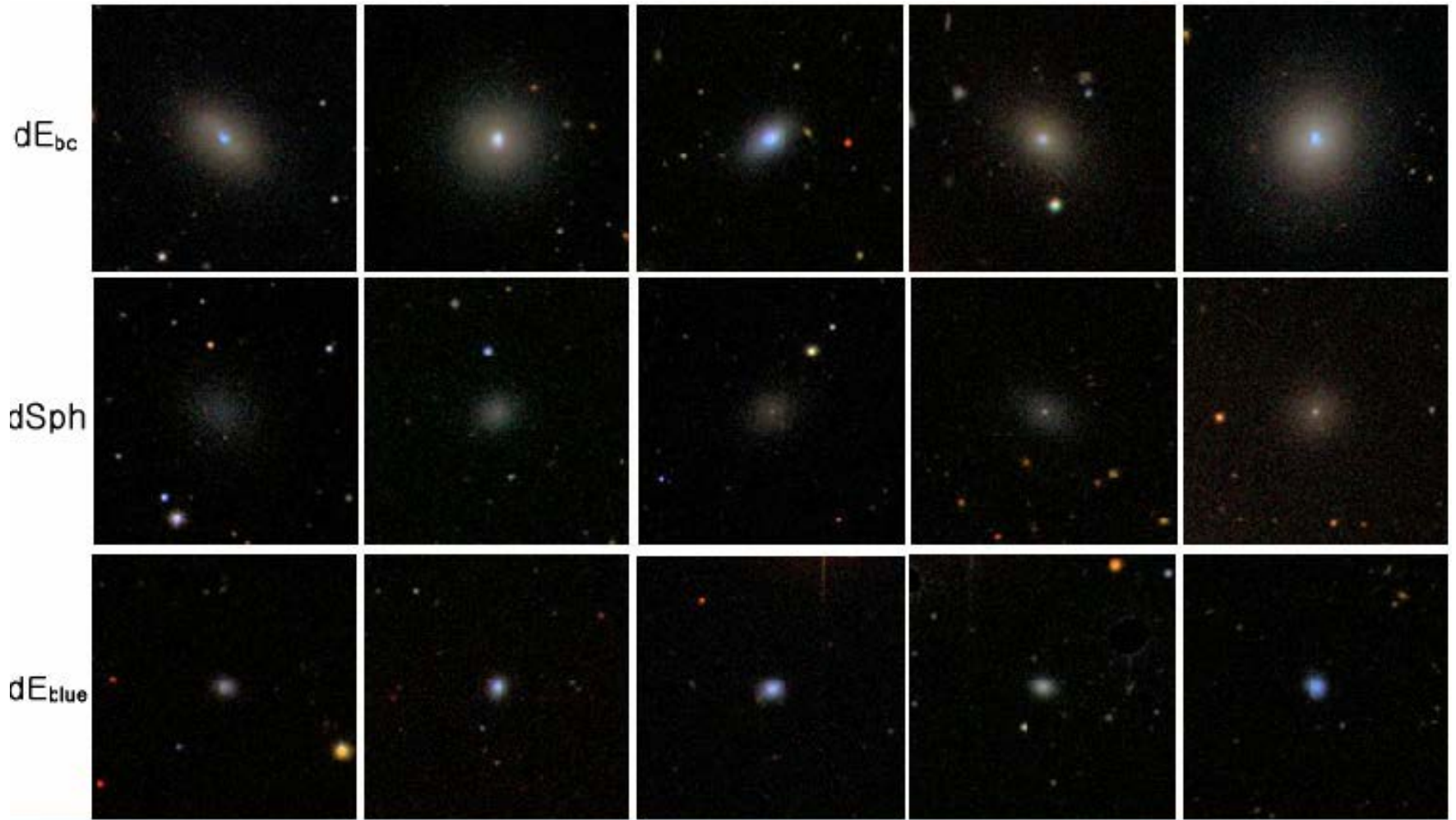
dE , dE_{bc} , dE_{blue} , $dSph$, $dS0$ ($dS0_p$) \w or \wo nucleation

(Ann et al 2015, ApJS, 217, 27)

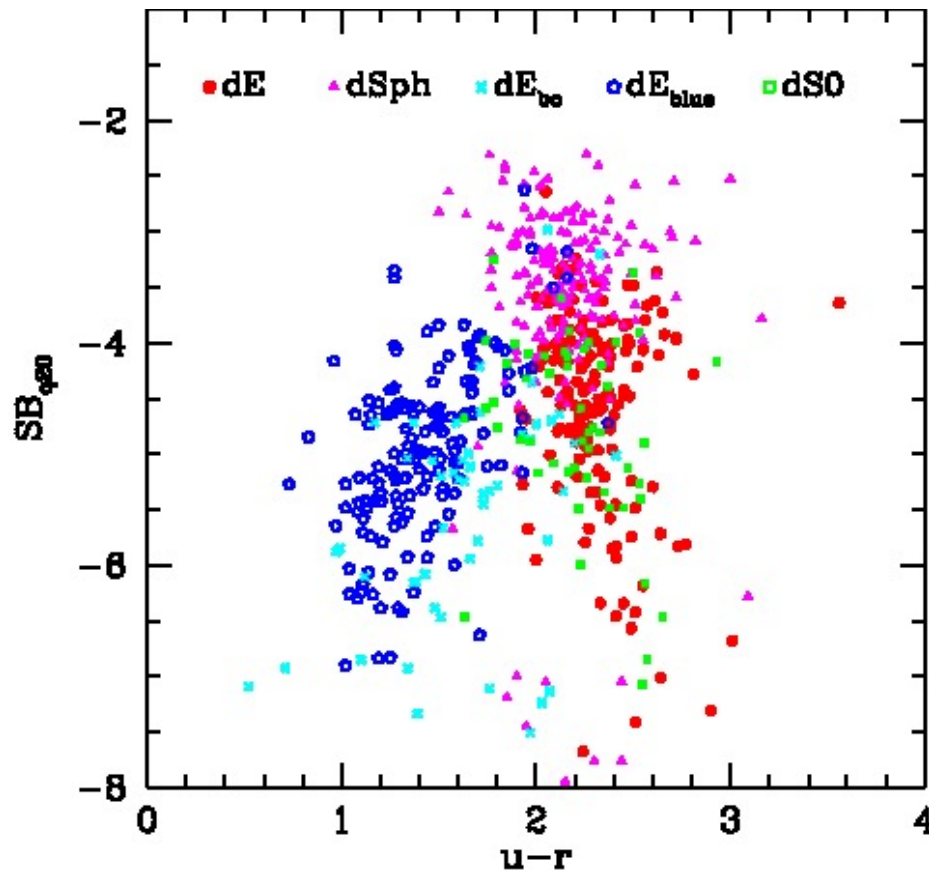
Type Examples: dS0 & dE



Type Examples: dE_{bc} , $dSph$, dE_{blue}

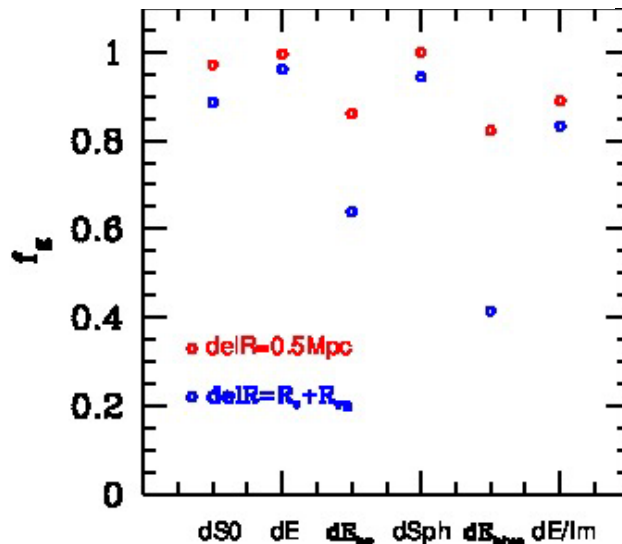
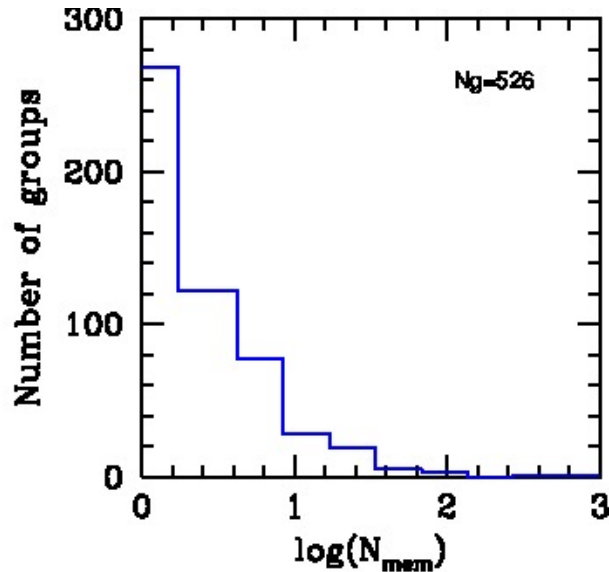


Surface brightness and color of dE-like galaxies



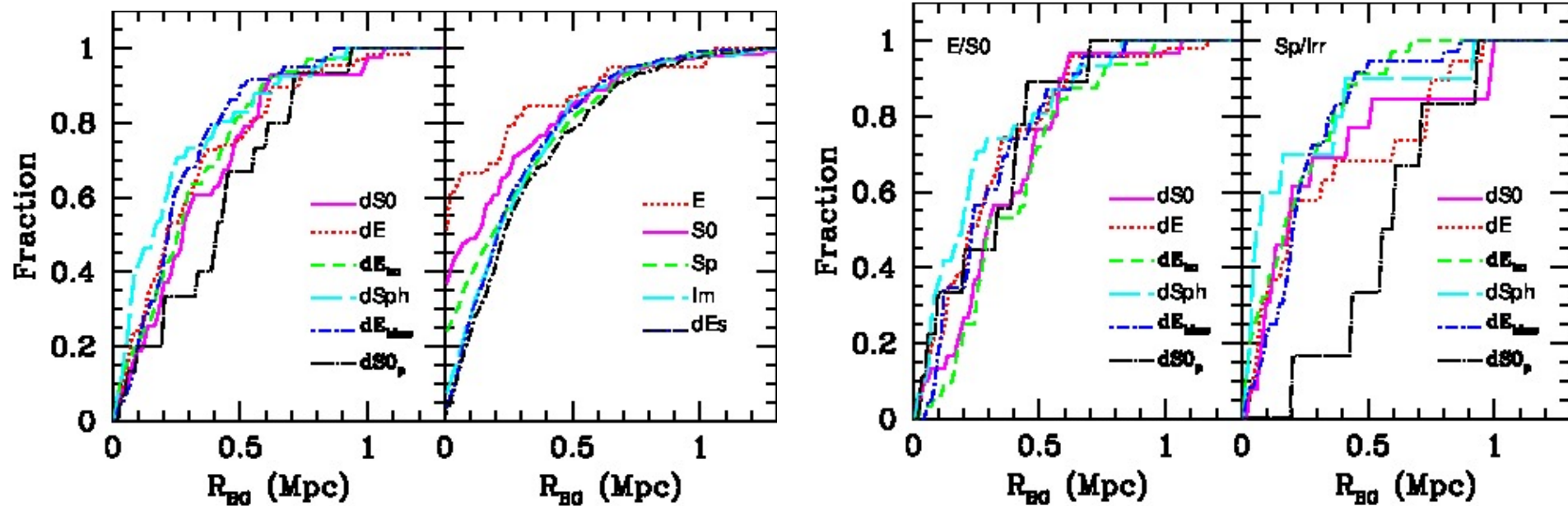
The colors of dSph and dE are very similar but their surface brightness is much different. The colors of dE_{bc} are overlapped with that of dE_{blue}. The surface brightness of dE_{blue} is similar to dE and dE_{bc}. The dS0 has colors and surface brightness similar to those of dE.

Dwarf galaxies as group members



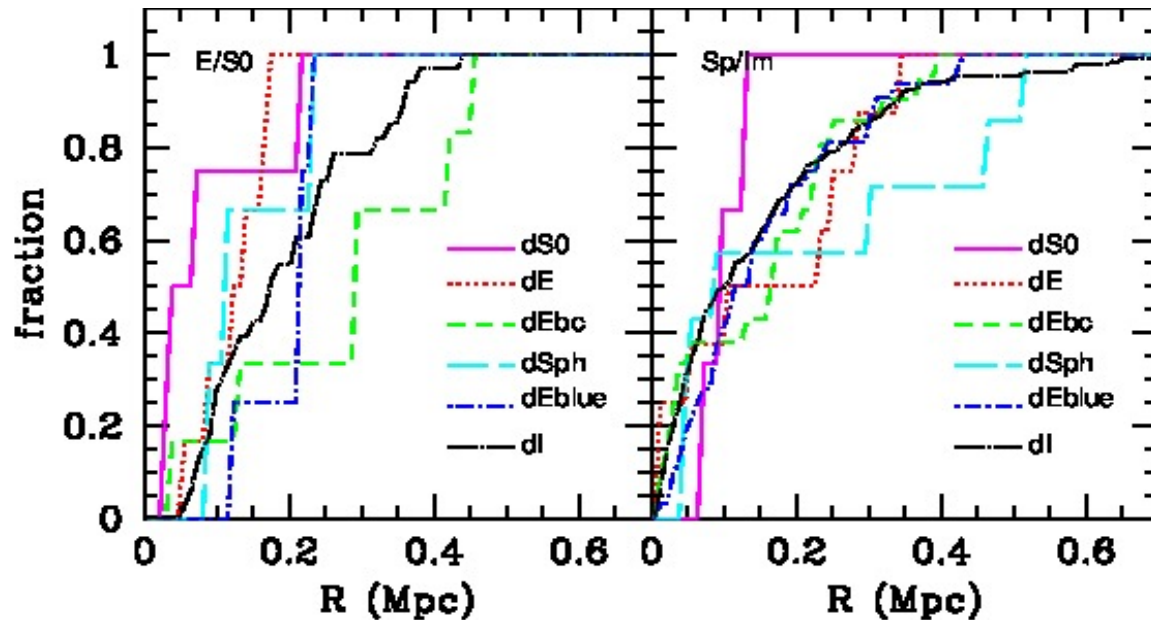
- For 5836 galaxies at $z < 0.01$, 526 groups are found by `fof` with variable LD and $LV = 500 \text{ km/s}$
- Among 1092 dE-like galaxies, 238 galaxies ($\sim 20\%$) are not group members.
- $\sim 95\%$ of dS0, dE, and dSph are group members.
($>97\%$ for fixed LD)
- dE_{bc} (70%) and dE_{blue} (44%) have smaller fractions of non-group members.
(86% and 82% for fixed LD)
- E (93%) and S0 (90%) have larger fractions of group members.
(95% and 93% for fixed LD)

Dwarf galaxies as group members



- The spatial distribution of dS0_p in groups with late type central galaxies shows the lowest central concentration while dSph shows the highest central concentration.
- The majority (>80%) of dS0_p are located at $R_{BG} > 0.4$ Mpc.
- E & S0 galaxies are centrally concentrated. About 50% of E galaxies are group central galaxies.

Dwarf galaxies as satellites



- The dSph galaxies in isolated satellite systems hosted by late type galaxies are less centrally concentrated than other dwarf elliptical-like galaxies.
- About 70% of dEbc galaxies are located at $R > 0.3$ Mpc in the satellite systems hosted by early type galaxies.



Conclusions

- The spatial distribution of dSph galaxies in the isolated satellite systems hosted by late type galaxy is less centrally concentrated than other types of dwarf galaxies . The dSph galaxies in groups are very centrally concentrated .
- A majority of dwarf lenticular galaxies with traces of spiral arms (dS0p) are located in the outer part of the groups with late type central galaxies, suggesting late accretion or weak interactions.
- The blue-cored dwarf elliptical galaxies (dEbc) avoid the vicinity of the early type hosts, suggesting that the blue cores are caused by young stars from accreted cold gas.

Thank You!