

# Dust Extinction in Star Forming Galaxies

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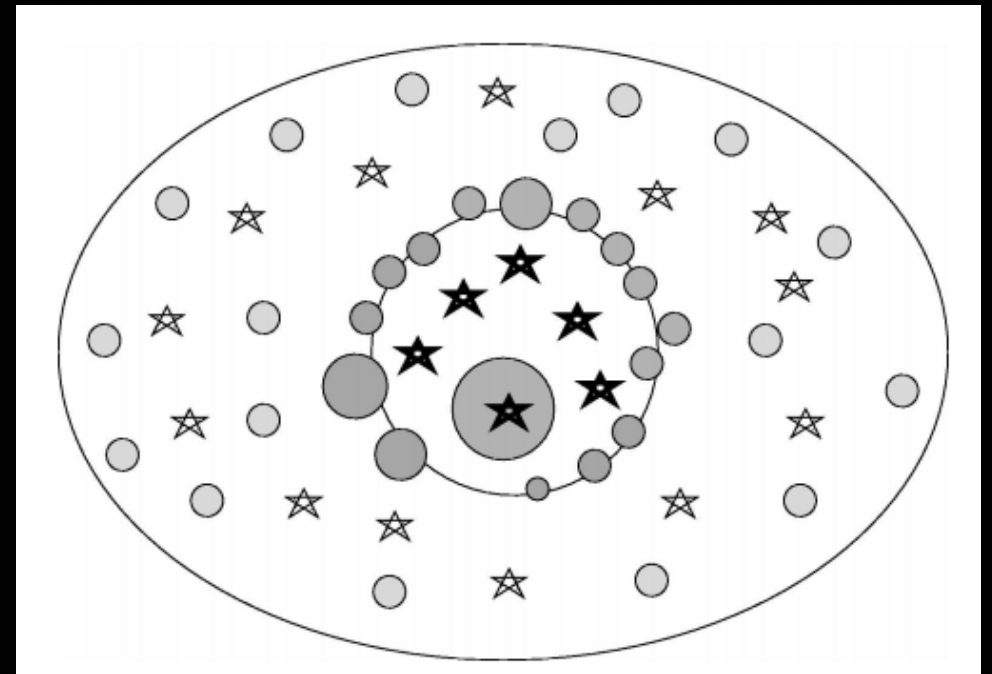
# Background

## Calzetti 1997

$$\bullet E_s(B - V) = 0.44 E_g(B - V)$$

SPS                      Line ratio

- Dust/Star distribution
  - Emission comes from HII
    - Affect by HII dust and diffuse dust
  - Continuum comes from star
    - Mainly affect by diffuse dust



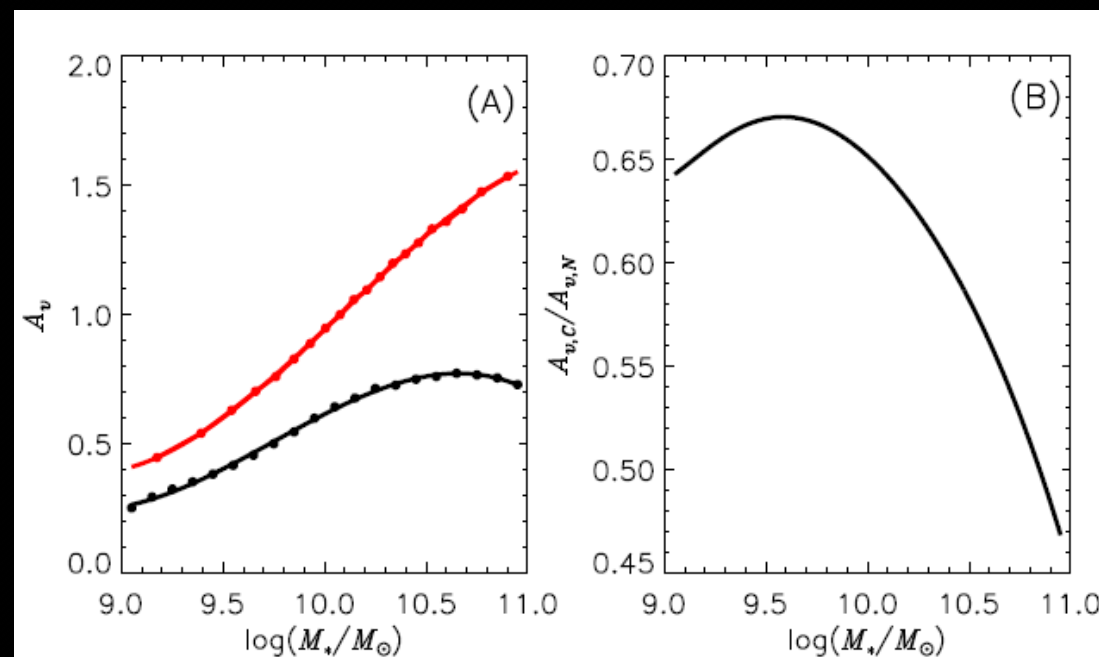
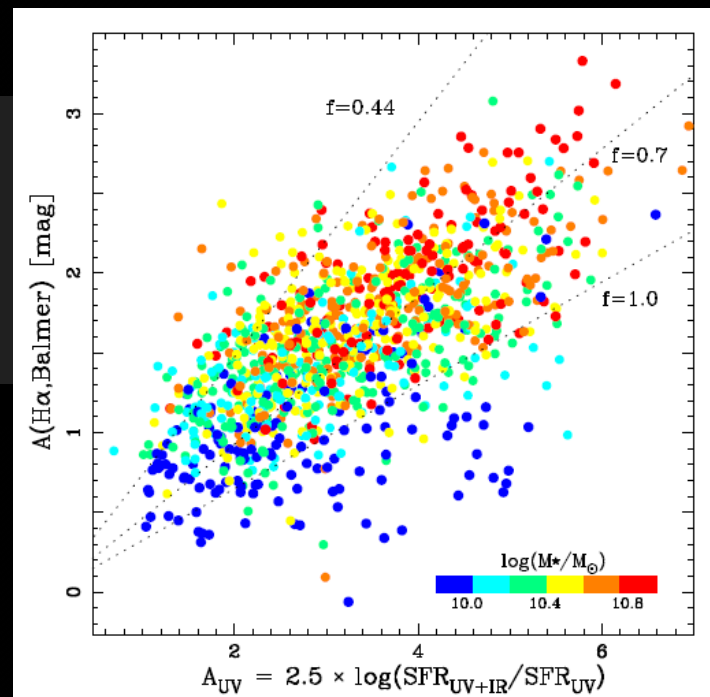
# Background

- Koyama 2015

- $\frac{E_S(B-V)}{E_g(B-V)} \in (0.44, 1)$
- $M_* \uparrow, \frac{E_S(B-V)}{E_g(B-V)} \downarrow$

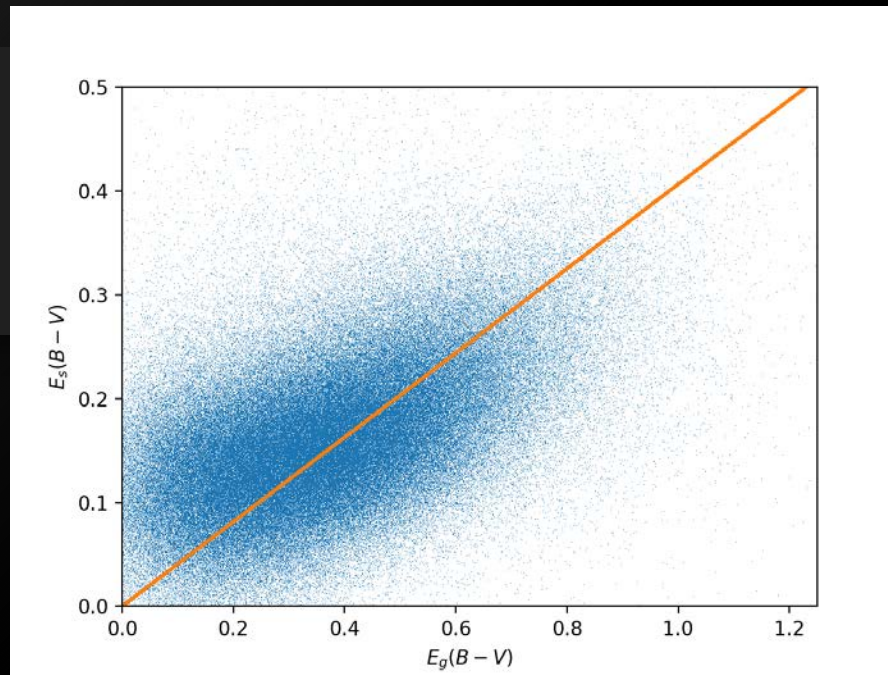
- Zahid 2017

- Low mass :  $M_* \uparrow, \frac{A_{V,S}}{A_{V,g}} \uparrow$
- High mass:  $M_* \uparrow, \frac{A_{V,S}}{A_{V,g}} \downarrow$

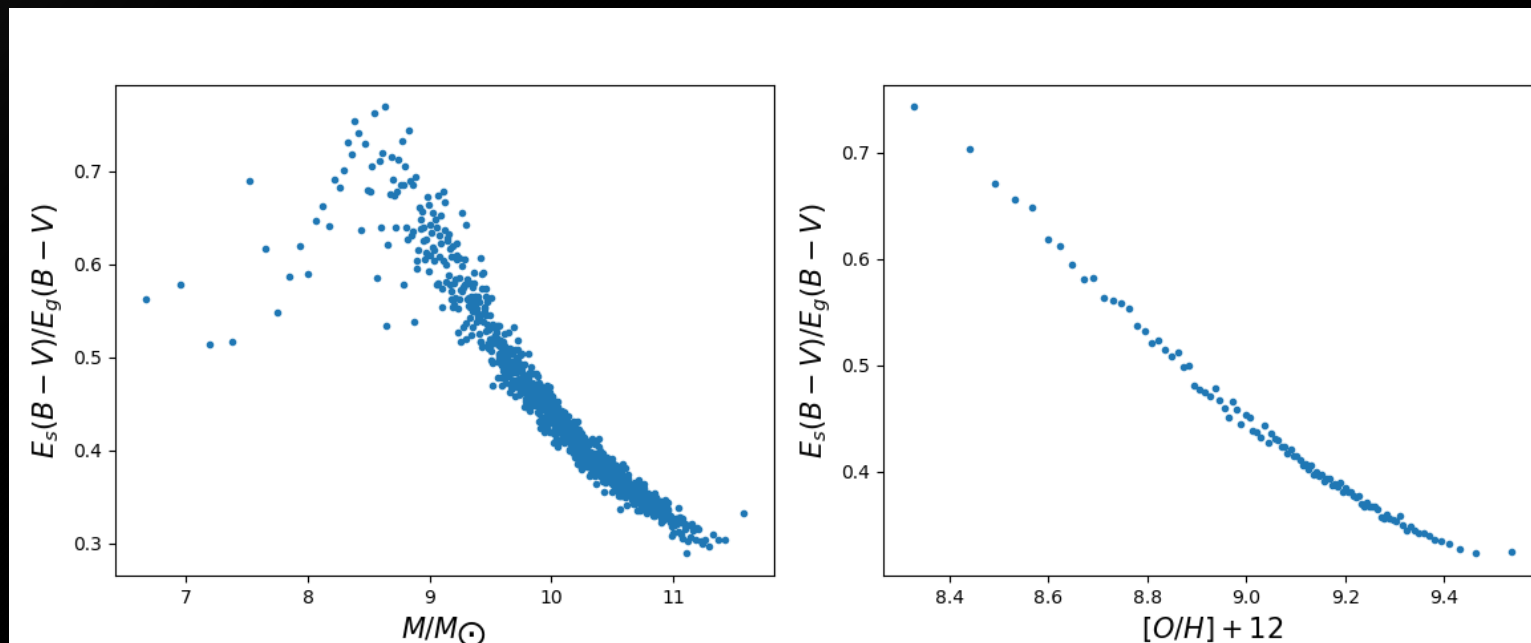


# Methods and results

- SFG pick
  - SDSS DR7
  - BPT diagram (Kauffmann2003)
  - Mass/emission line/inclination
  - $\sim 170,000$

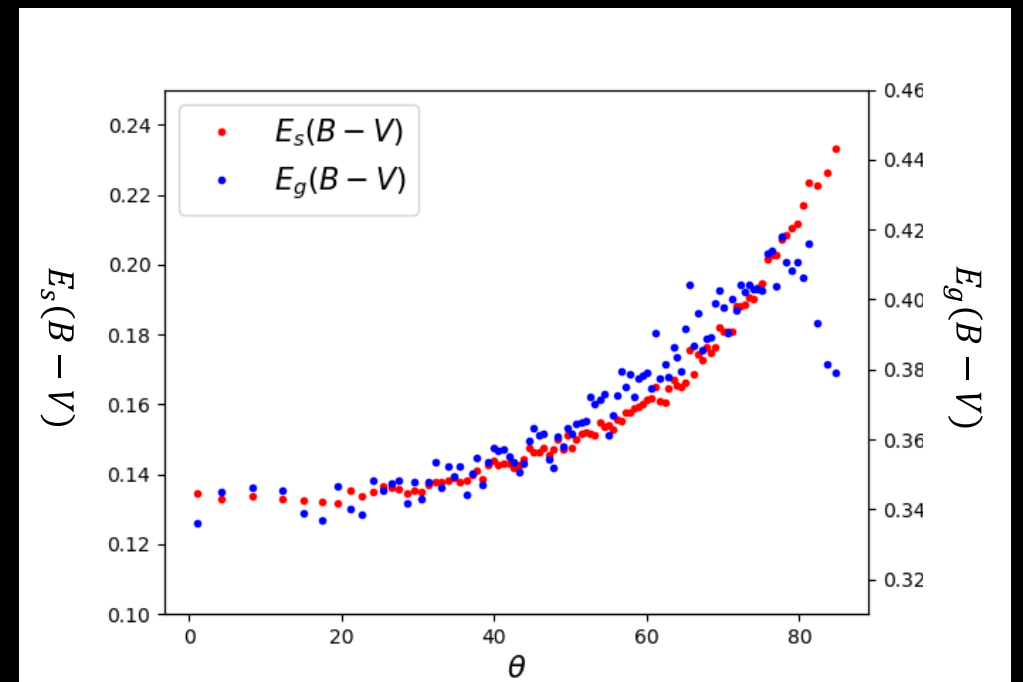
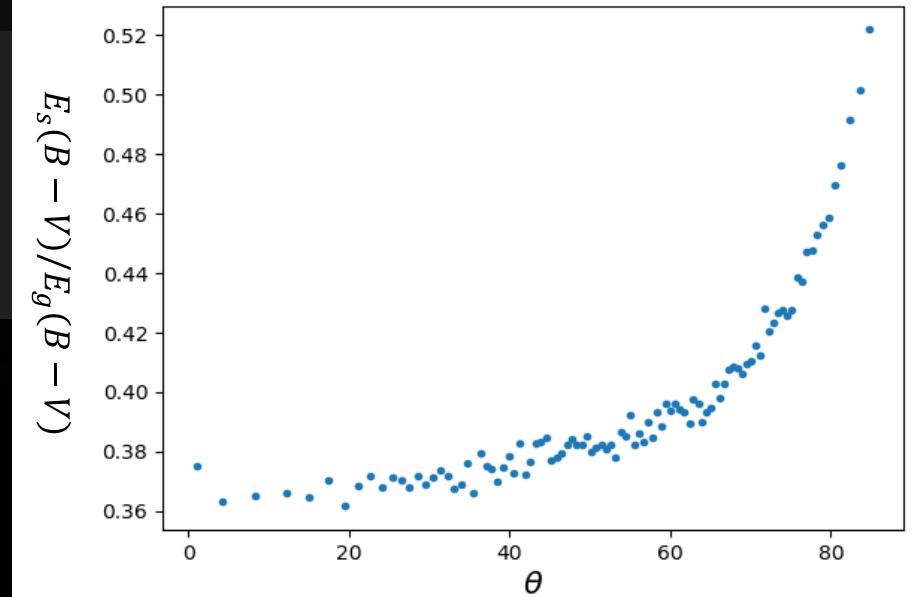
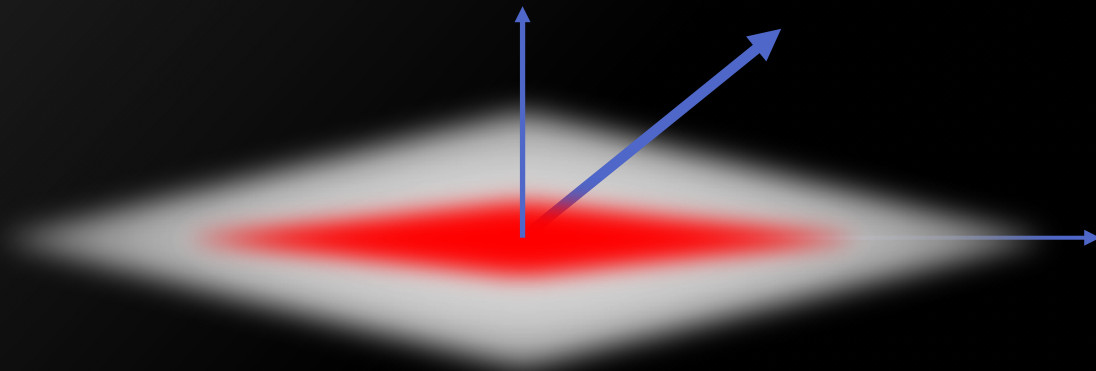


- $E_s(B - V)$  &  $E_g(B - V)$ 
  - $\frac{E_s(B-V)}{E_g(B-V)} = 0.41$
  - $\sim$  Calzetti 1997 (0.44)



# Methods and results

- Inclination data from Simard 2011
  - $\theta=90^\circ \rightarrow$  edge-on
- $E_s(B - V)$  and  $E_g(B - V)$  have similar shape when inclination less than  $75^\circ$ .
  - High inclination leads to long optical path
- Above  $75^\circ$ ,  $E_g(B - V)$  decreases.
  - Because of optical thick, when edge-on, only surface light can emit out.



# Further work

- Model
  - *GM*(geometric model)
    - Stellar(diffuse dust) disk
    - HII(nebula dust) disk
  - *CEM*(chemical evolution model)
- Observational limitation
  - galaxy mag
  - Emission line flux
  - IR luminosity
  - .....

$$E(B-V) - \theta - O/H$$

$$E(B-V) - \theta - M_*$$

