赤外線銀河のダストについて

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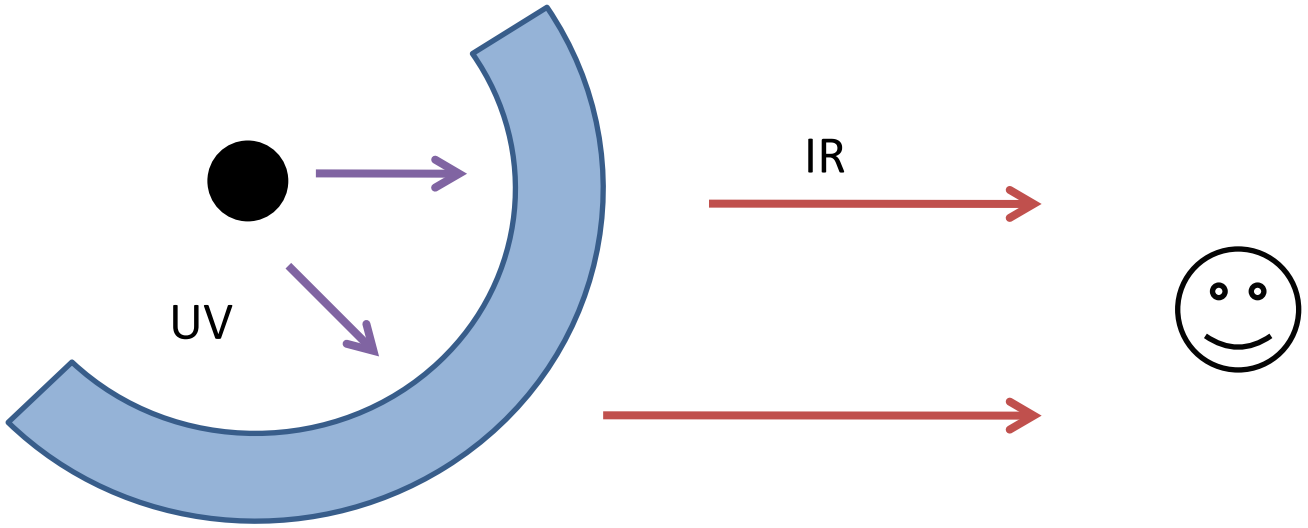
Intro

・赤外線銀河とは？

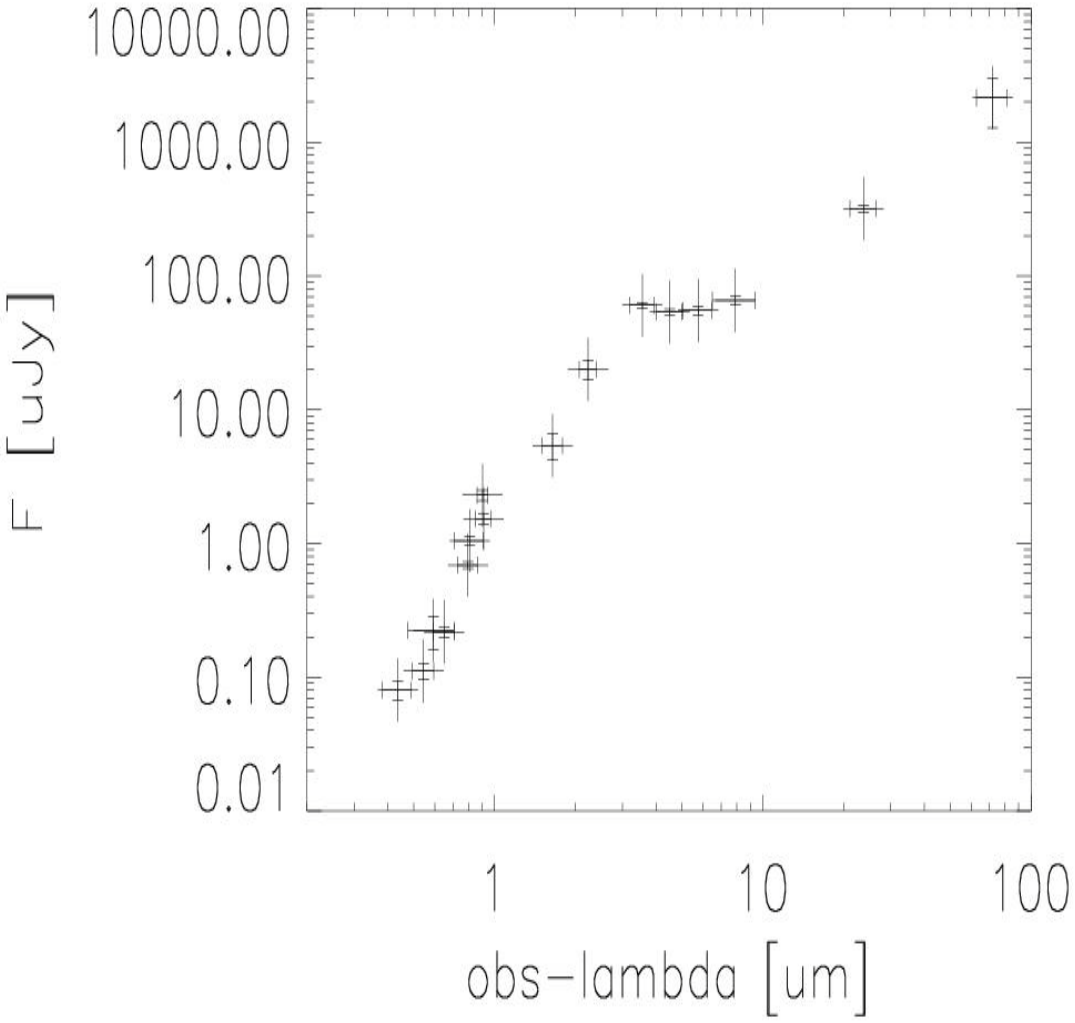
$L_{8\text{-}1000um}$ > $10^{11}L_{\odot}$ → LIRG(Luminous Infra Red Galaxy)
> $10^{12}L_{\odot}$ → ULIRG
> $10^{13}L_{\odot}$ → HyLIRG

・エネルギー源：starburst or AGN ??

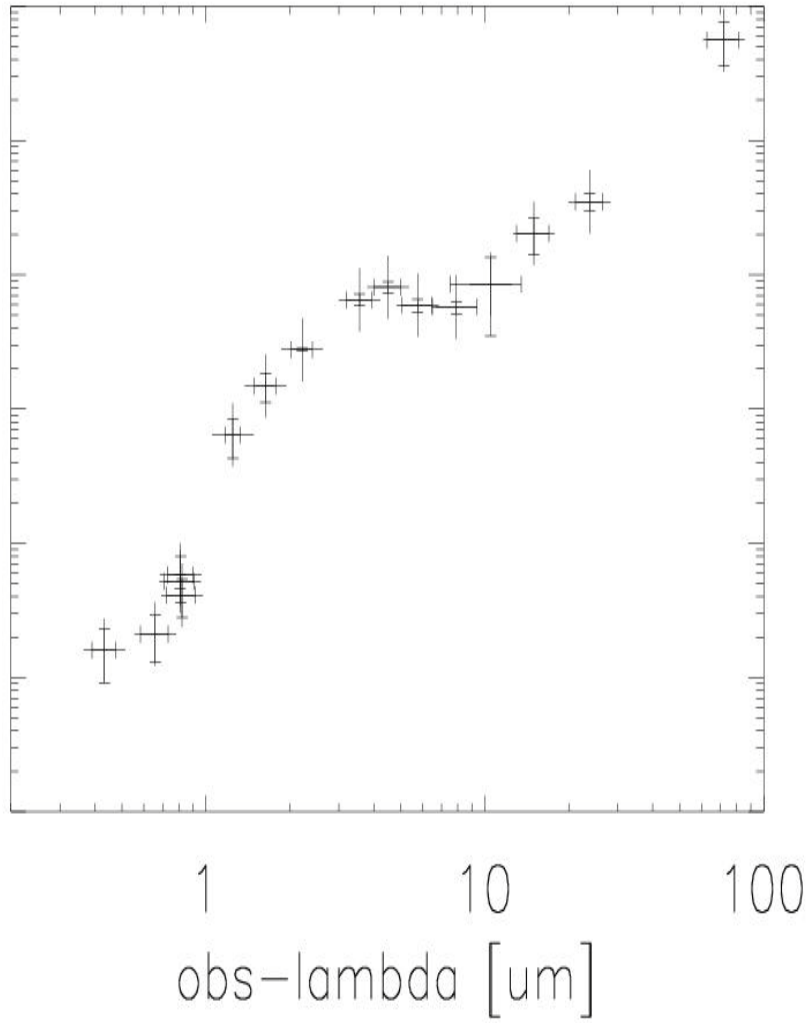


Data

SST J1604+4304 (z=1.135)



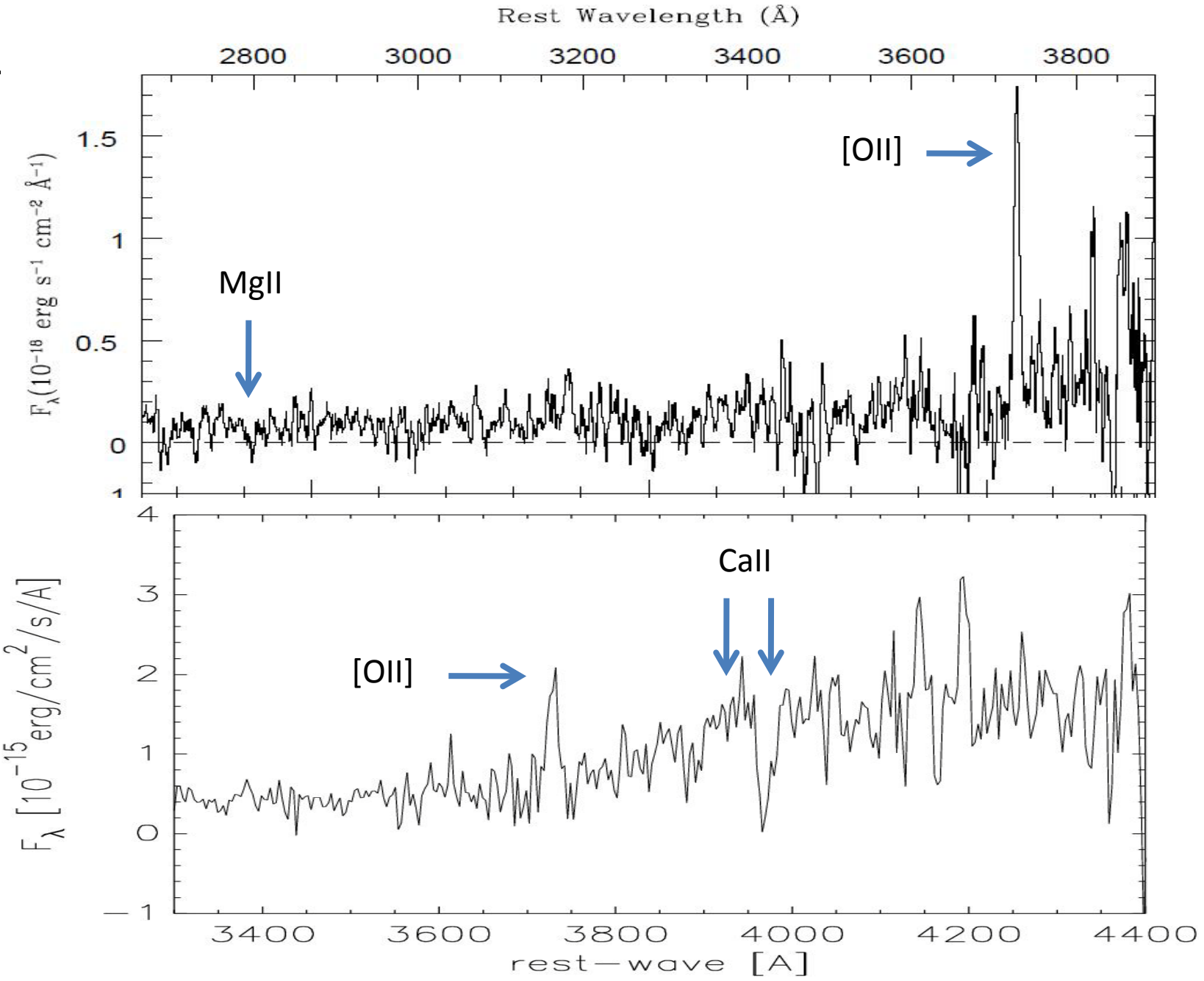
HR10 (z=1.44)



Data

HR10

SST

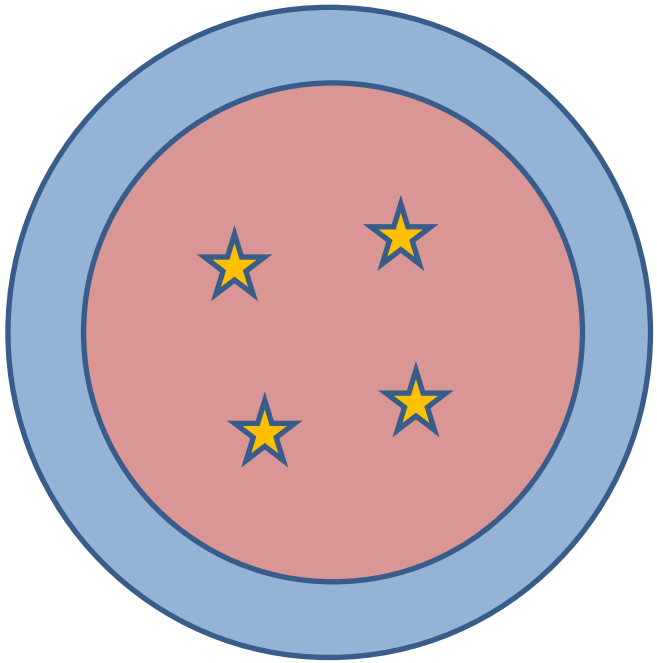


Dust

- Distribution
  - internal dust

$$F_\nu = F_\nu^0 \exp(-\tau_{ap})$$

$$\tau_{ap} = -\ln\left[\frac{1-\exp(-\tau_{eff})}{\tau_{eff}}\right]$$



  - screen dust

$$F_\nu = F_\nu^0 \exp(-\tau_{ap})$$

$$\tau_{ap} = N\left(1-\exp(-\tau_{eff}/N)\right)$$

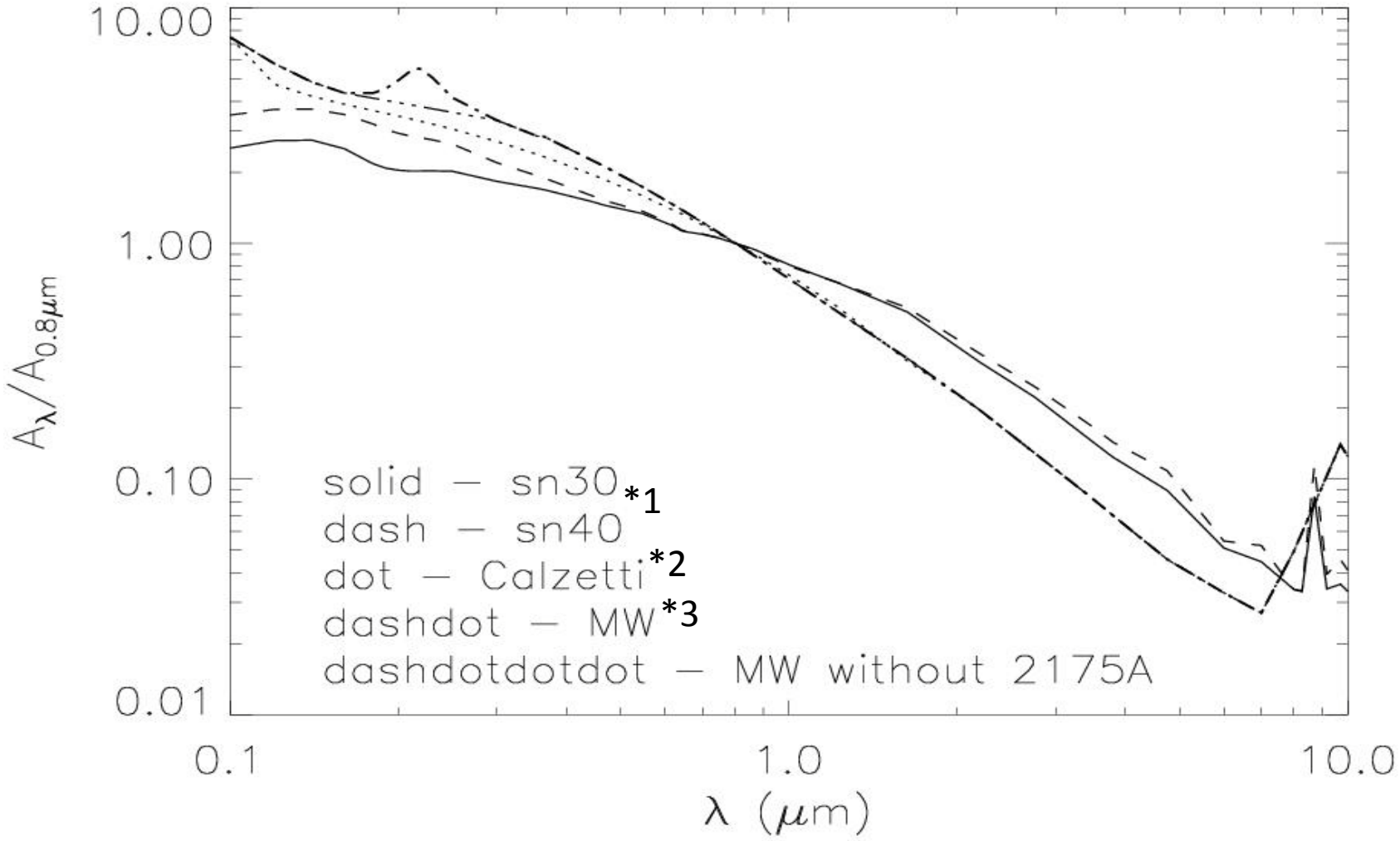
scatteringの仕方も考慮

- no scattering
- forward-only scattering
- isotropic scattering

Dust

- Extinction curve

*1 (Nozawa et al. 2003, Hirashita et al. 2005)
*2 (Calzetti 2001)
*3 (Draine 2003)



Model

- Star formation

  BC03 (Bruzual & Charlot 2003)

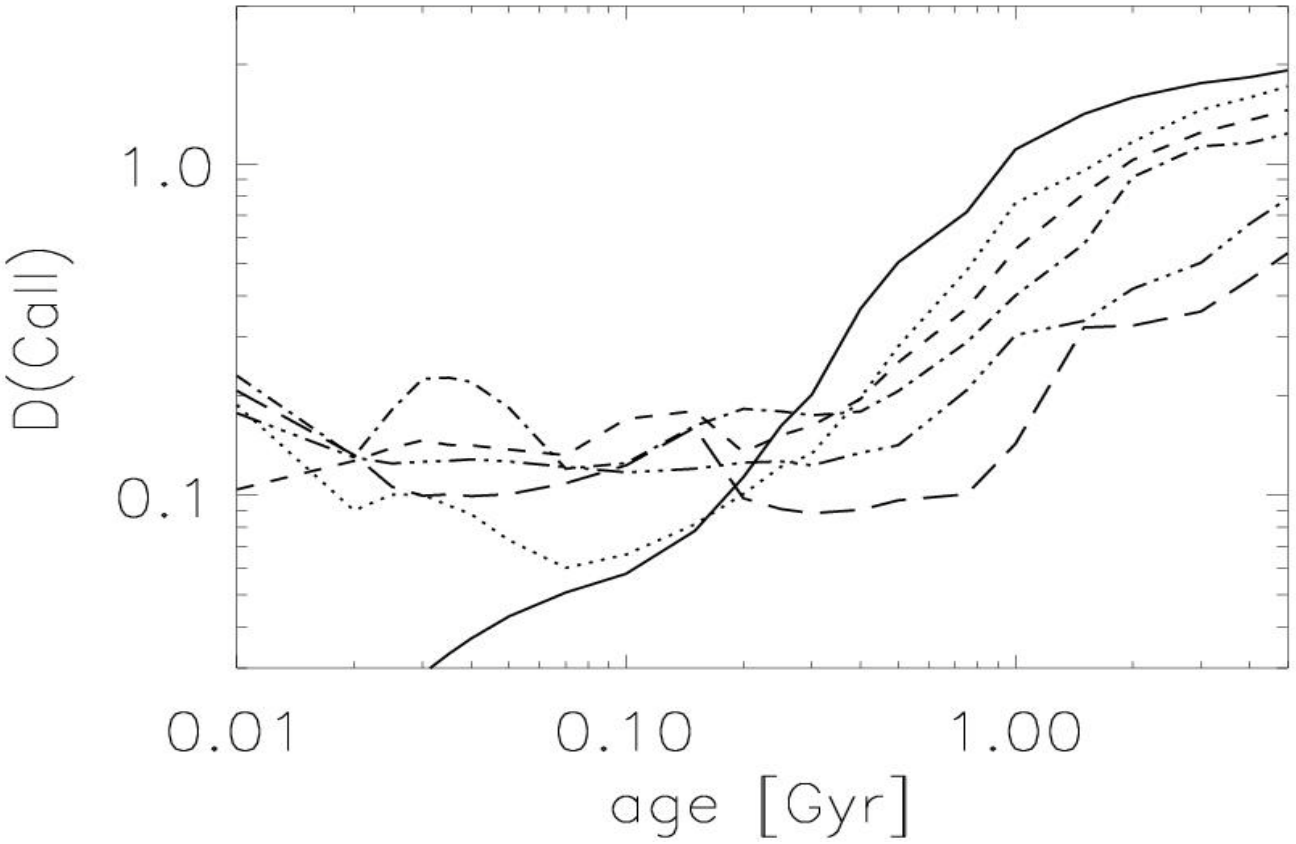
  - Salpeter IMF ($0.1M_{\odot}$~ $100M_{\odot}$)
  - exponentially declining model

$$SFR \propto \exp(-t/t_{sfr})/t_{sfr}$$

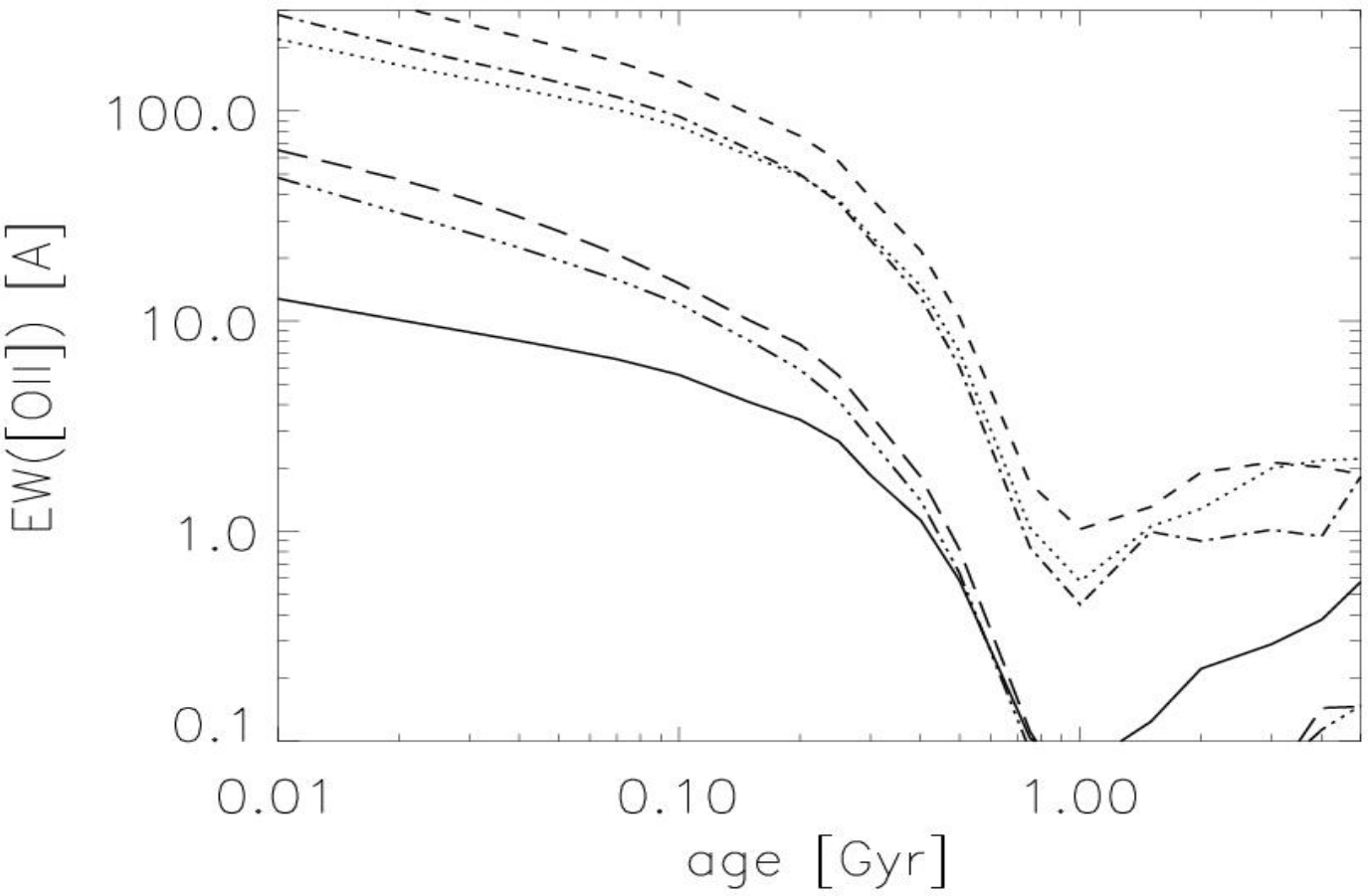
Age (t)	1 Myr ~ 5 Gyr
Timescale (t_{sfr})	10 Myr ~ 7 Gyr
Metallicity (Z)	0.005 $Z_{\odot}$ ~ 2.5 $Z_{\odot}$
Extinction ($A_{0.3um}$)	0.0 mag ~ 100.0 mag

Model

- Absorption line & Emission line
  - absorption line $D(CaII) = \dfrac{2 \times EW(CaIIK)}{EW(H_\varsigma) + EW(CaIIH + H_\varepsilon)}$



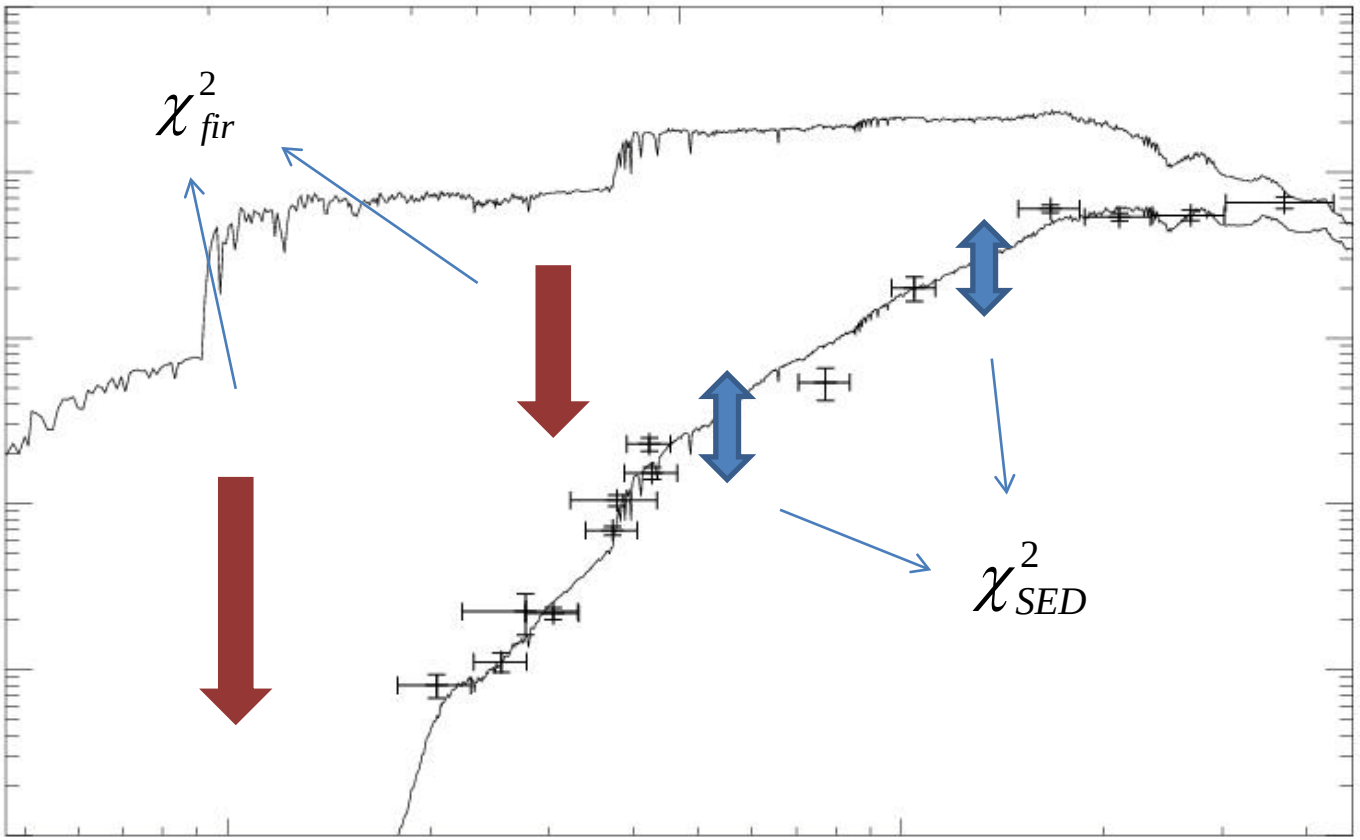
- emission line (Kewley et al. 2004)



lineでageを制限できる

Fitting

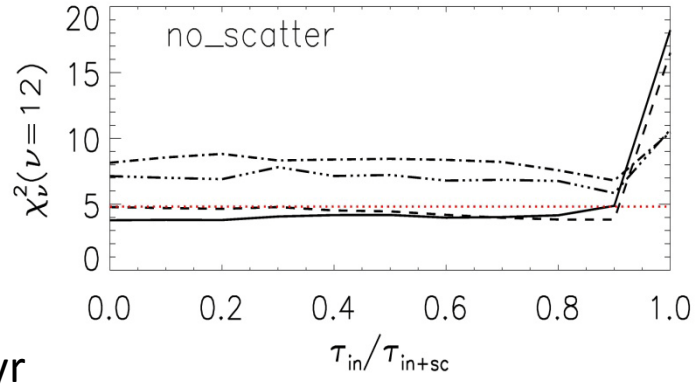
$$\chi^2 = \chi^2_{SED} + \chi^2_{line} + \chi^2_{fir}$$

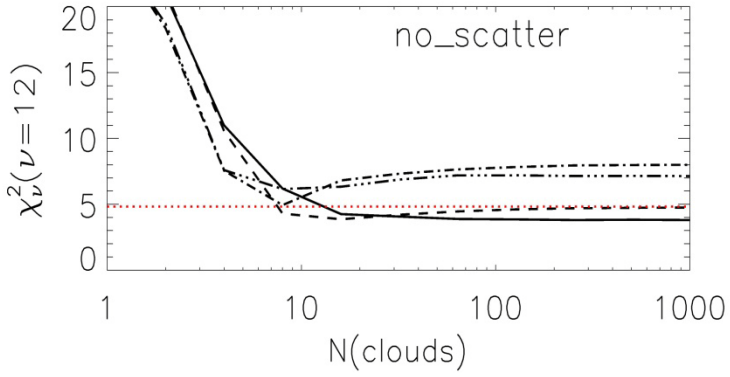


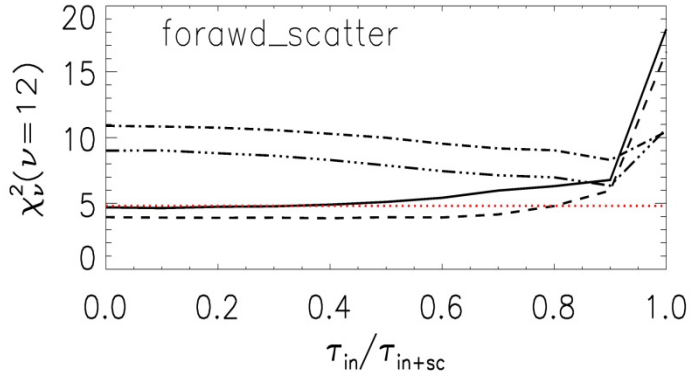
Result

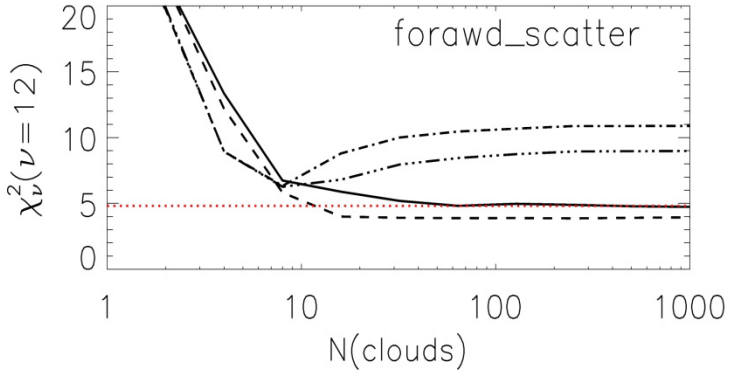
- SST

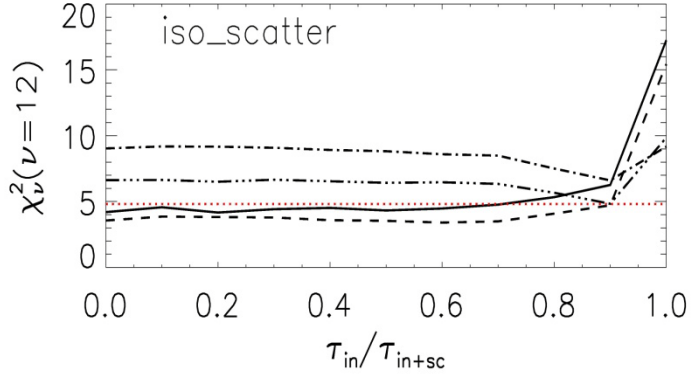
SN dust
- Age=500Myr

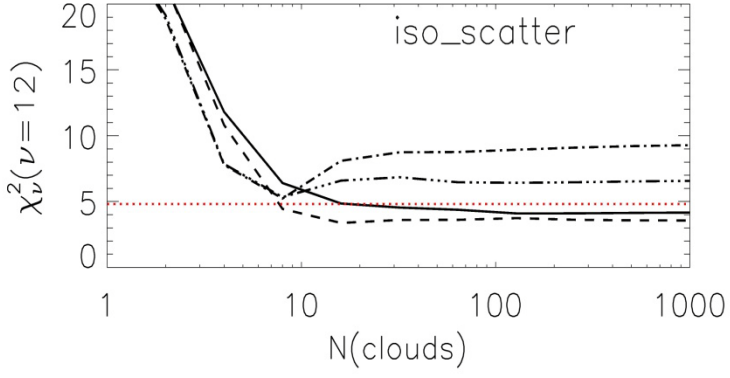








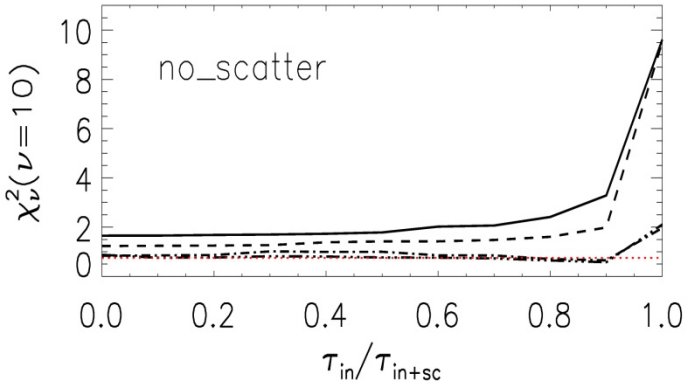


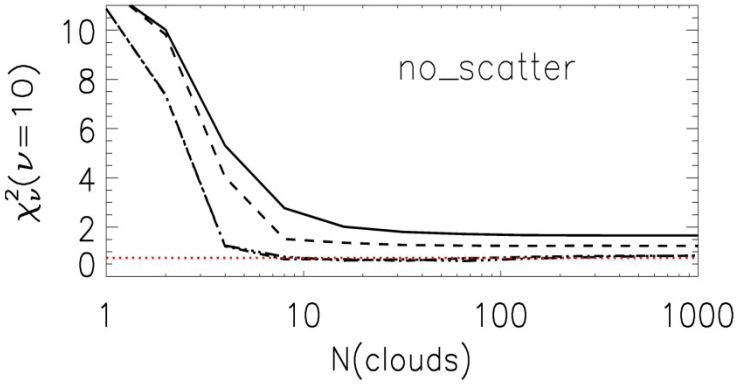


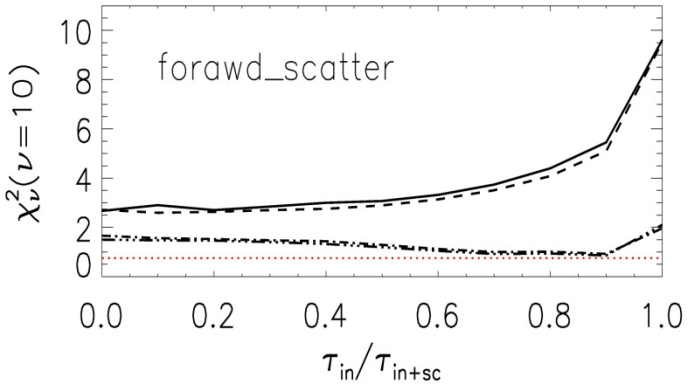
Result

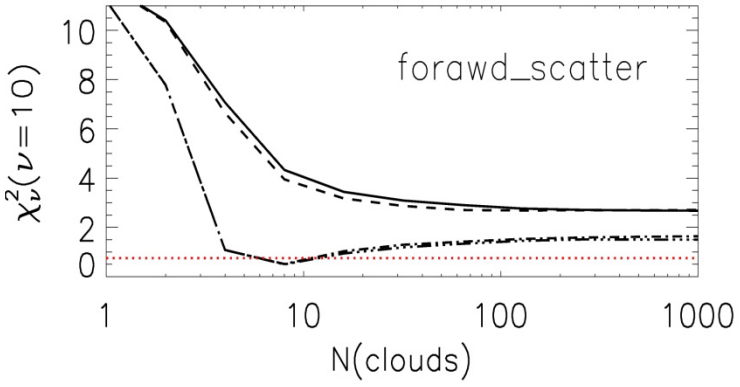
- HR10

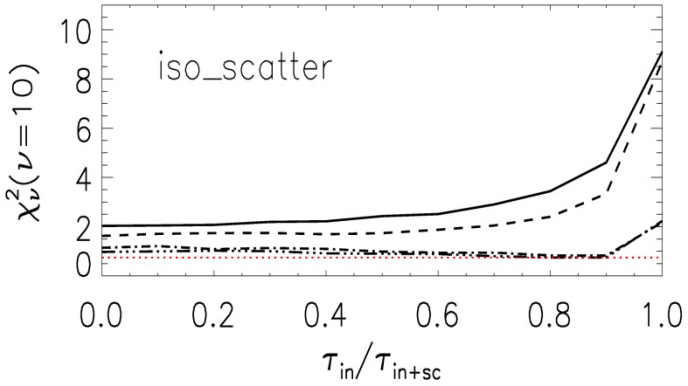
Calzetti dust
- Age=1.5Gyr

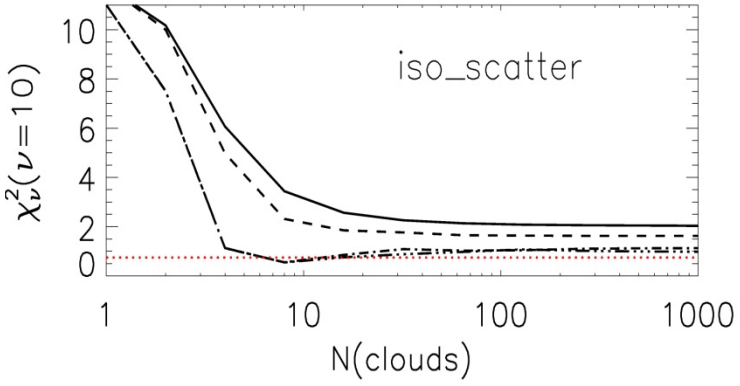












まとめ

・SED、line、LIRに対してχ2 fittingをした。

Ageが大　→　Calzetti dust
小　→　SN dust

・サンプル数を増やしたい。最低でも、1つずつ。

・金属量が一定として考えているので、ageとともに変化させる必要がある？