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Orientation effects on quasars SED

The torus IR emission

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The longstanding problem

The longstanding problem



Risaliti, Salvati, Marconi 2011

$L_{[OIII]}$ ISOTROPIC

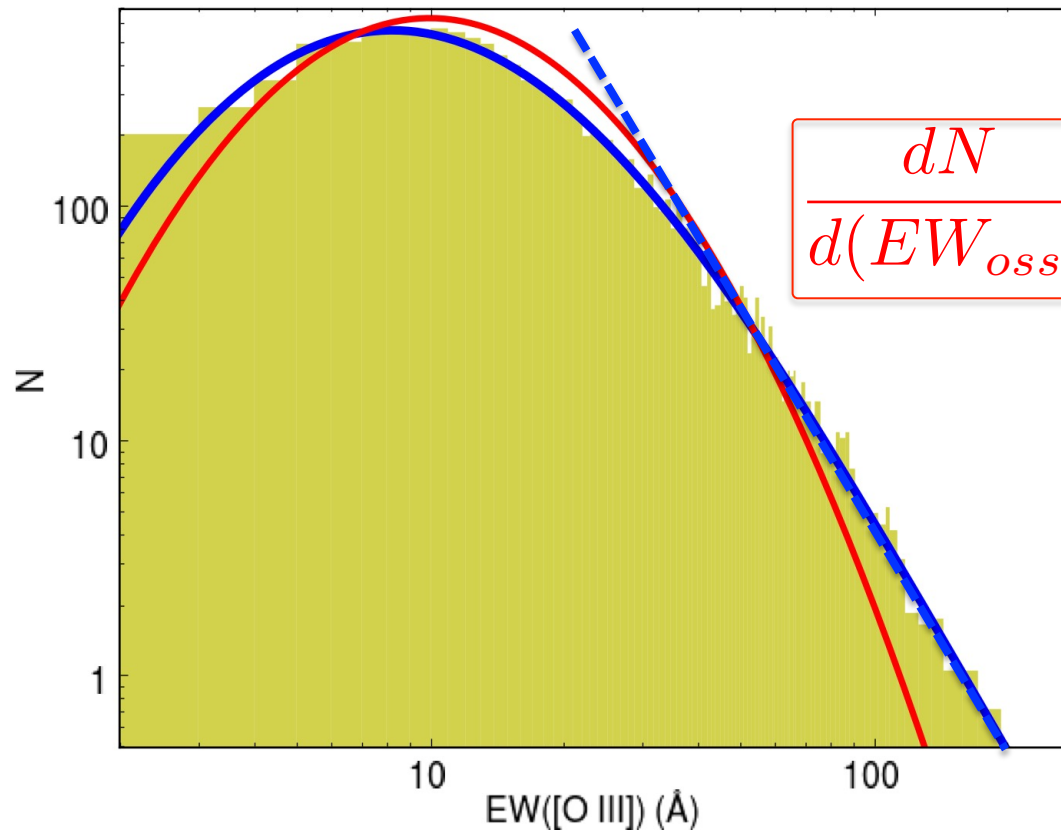
$$L_{DISK_{obs}} = L_{DISK_{int}} \cos \vartheta$$

$$EW_{[OIII]} \propto f(\vartheta)$$

EW[OIII] as an orientation indicator

~ 12000 blue objects
SDSS DR7

FLUX-LIMITED
sample

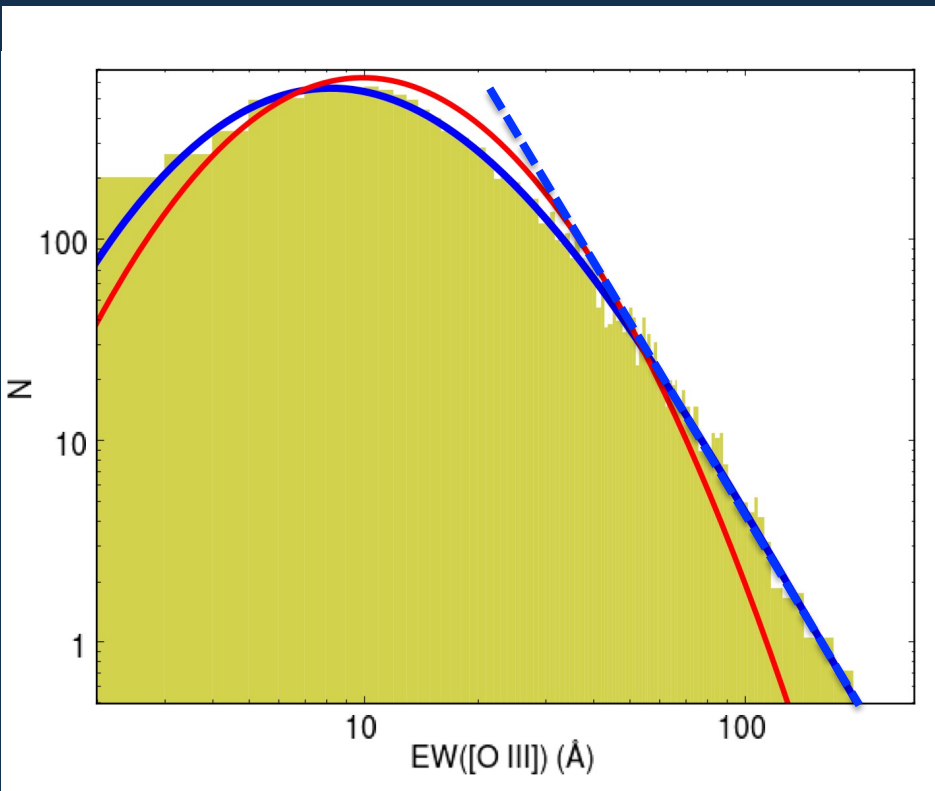


Bisogni, Marconi, Risaliti 2017

Susanna Bisogni, AGN13 Milano 9-12 October 2018

EW[OIII] as an orientation indicator

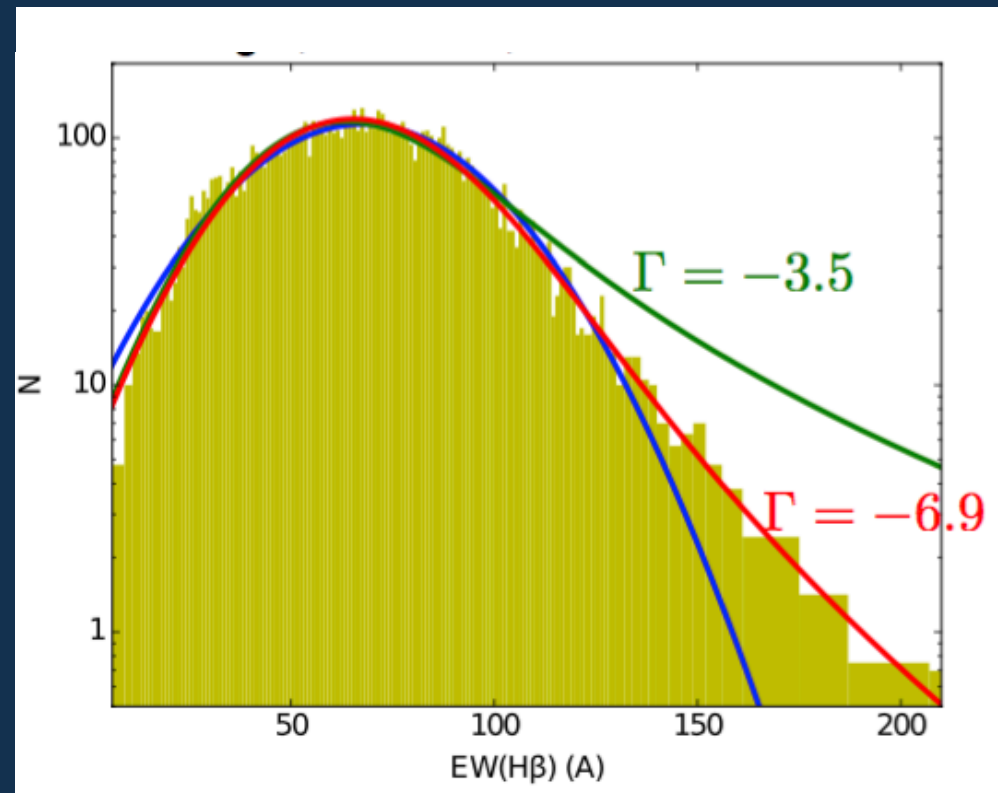
Bisogni, Marconi, Risaliti 2017



- Low EW[OIII]
→ Mostly *face-on* sources
- High EW[OIII]
→ *Edge-on* sources

EW[OIII] vs Broad Lines EW

Bisogni, Marconi, Risaliti 2017

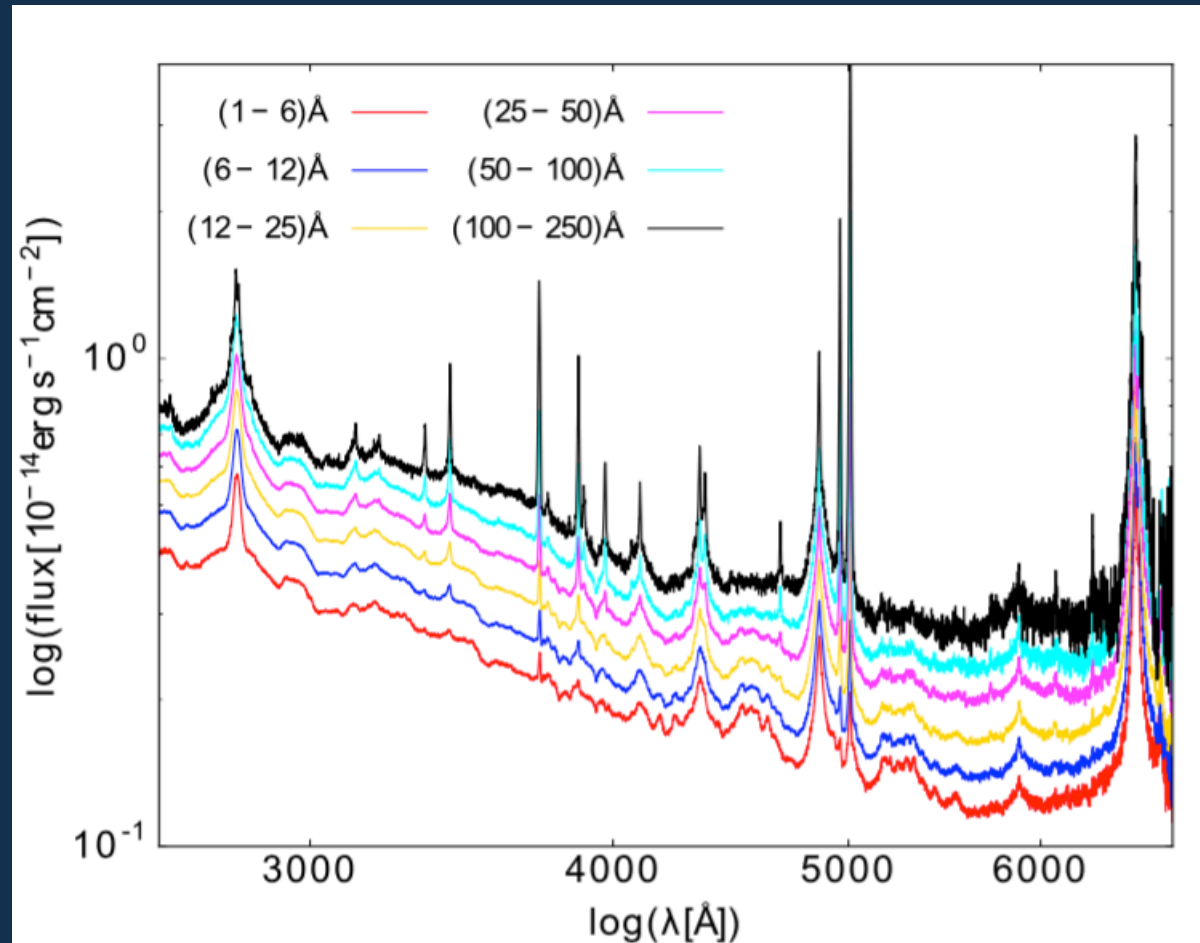
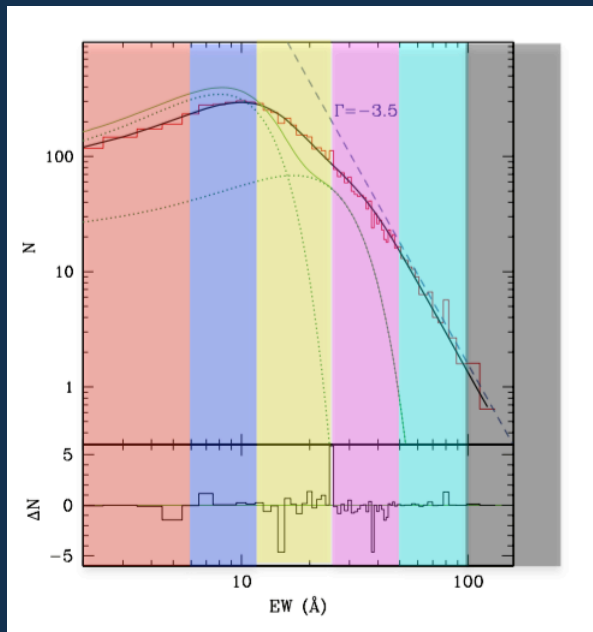


- Low EW[OIII]
→ Mostly *face-on* sources
- High EW[OIII]
→ *Edge-on* sources
- BLR → disk-shaped

EW[OIII] and optical spectral features

Bisogni, Marconi, Risaliti 2017

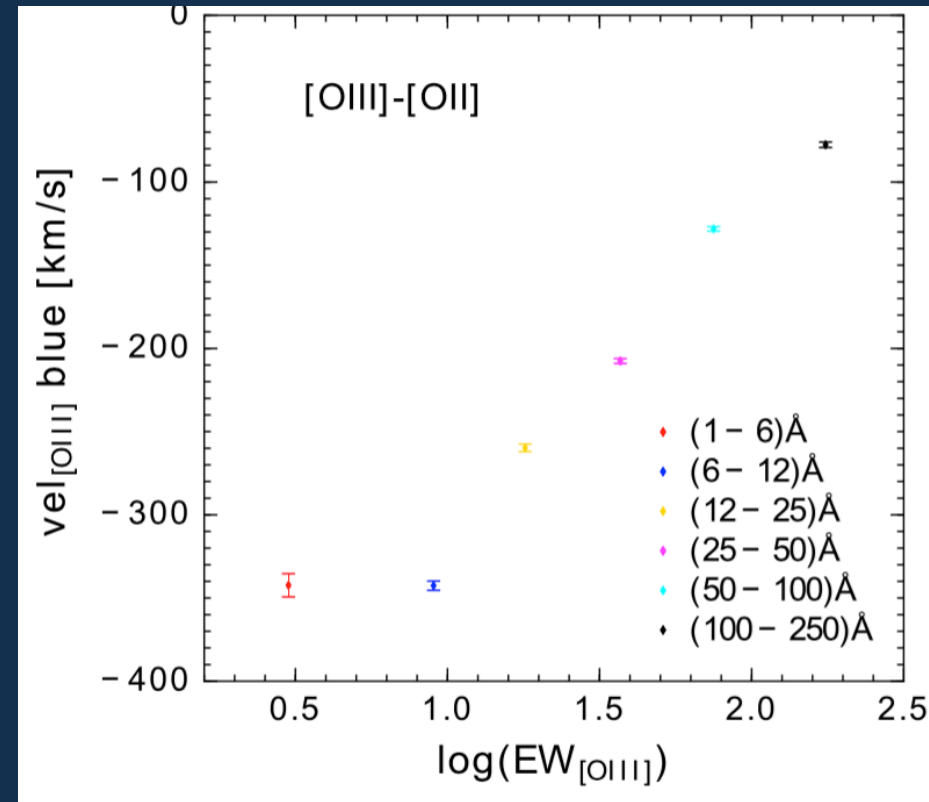
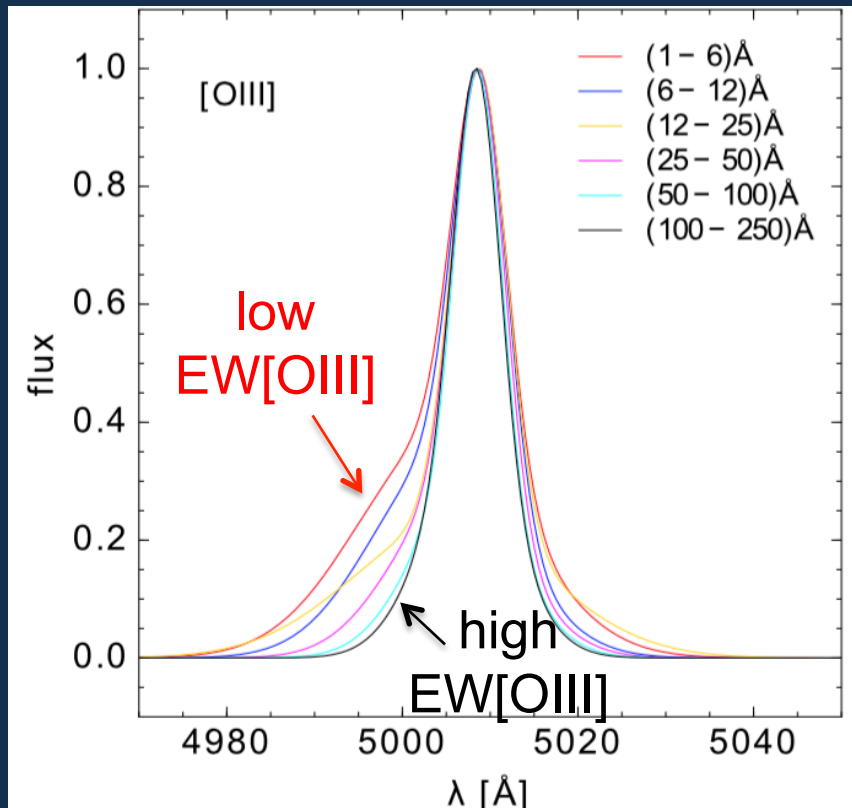
>12000 blue objects
from SDSS DR7



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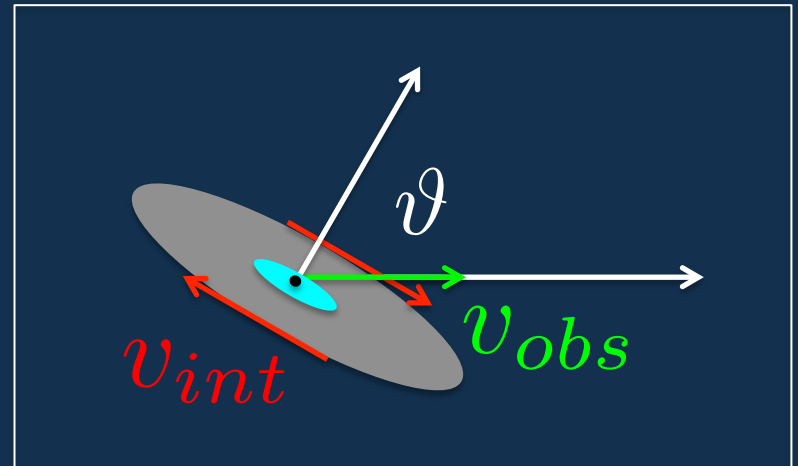
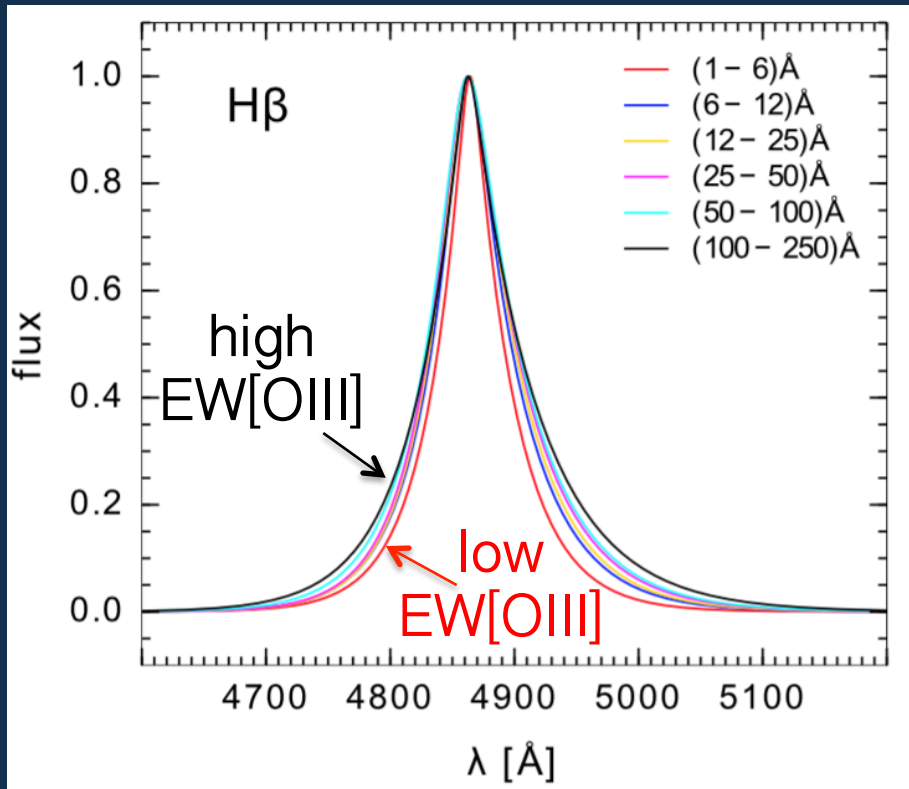
EW[OIII] and narrow lines

Bisogni, Marconi, Risaliti 2017



EW[OIII] and broad lines

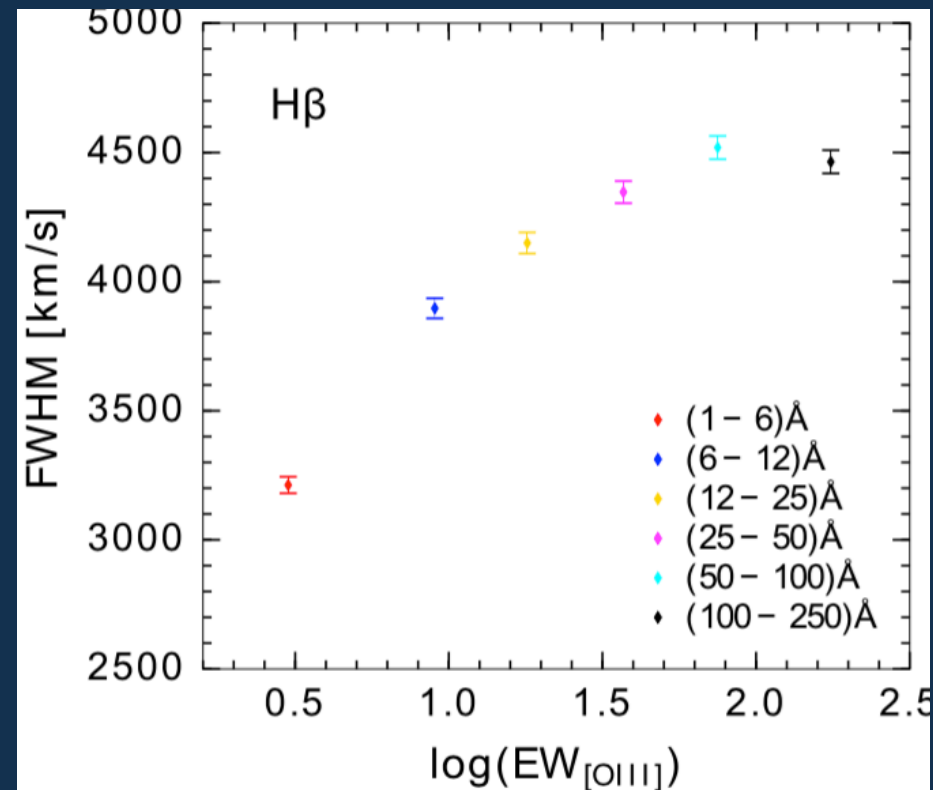
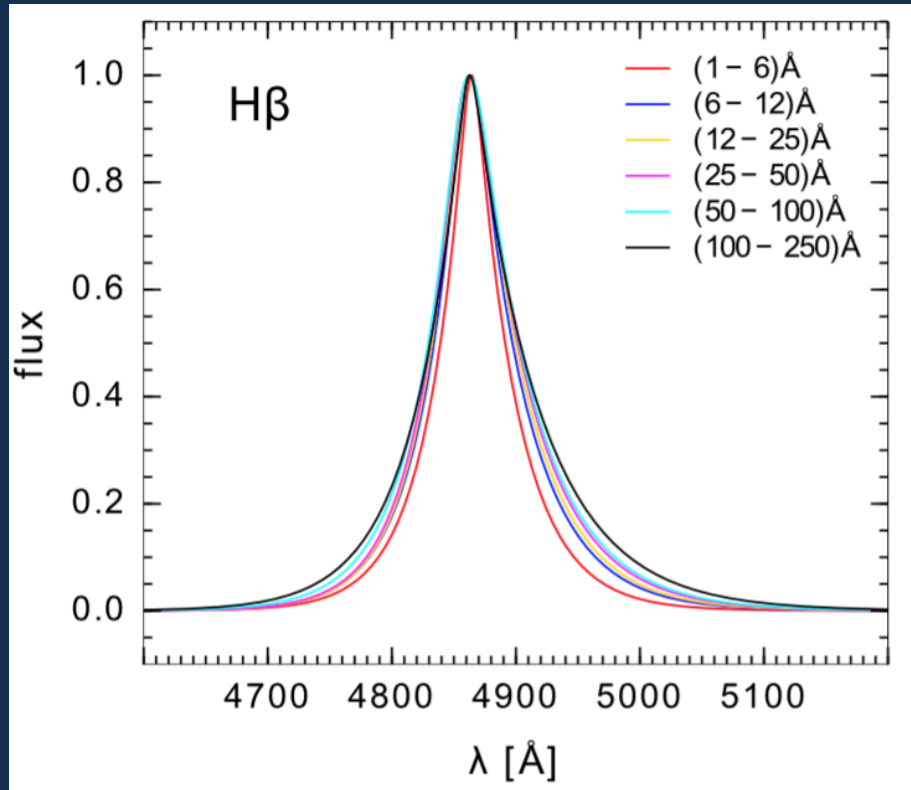
Bisogni, Marconi, Risaliti 2017



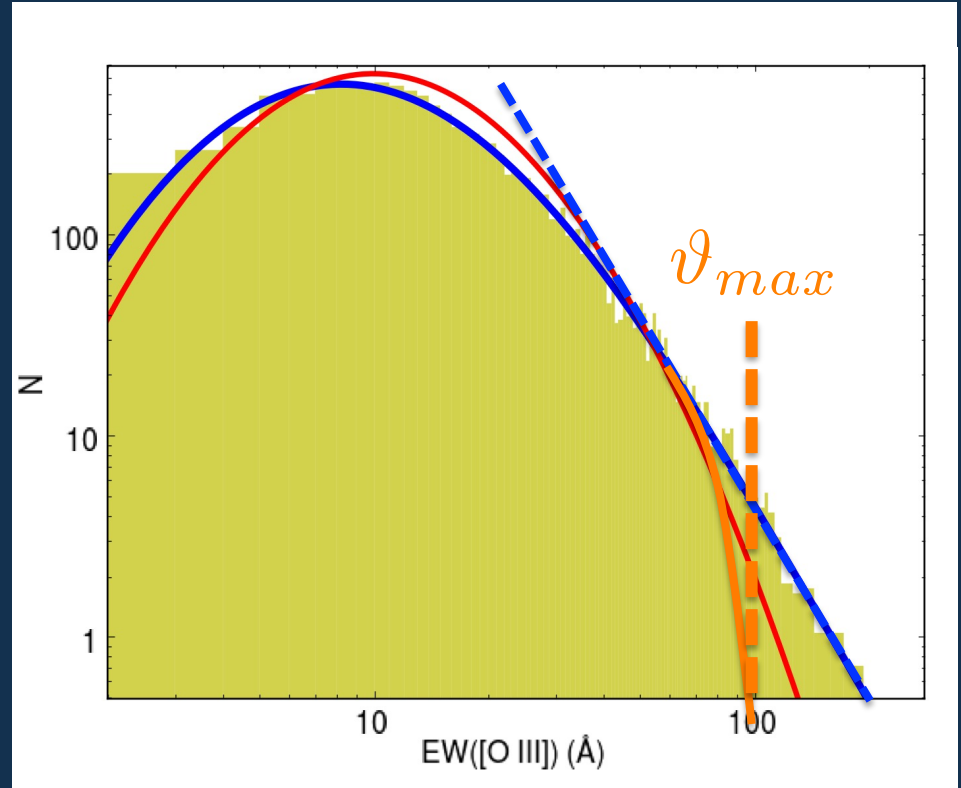
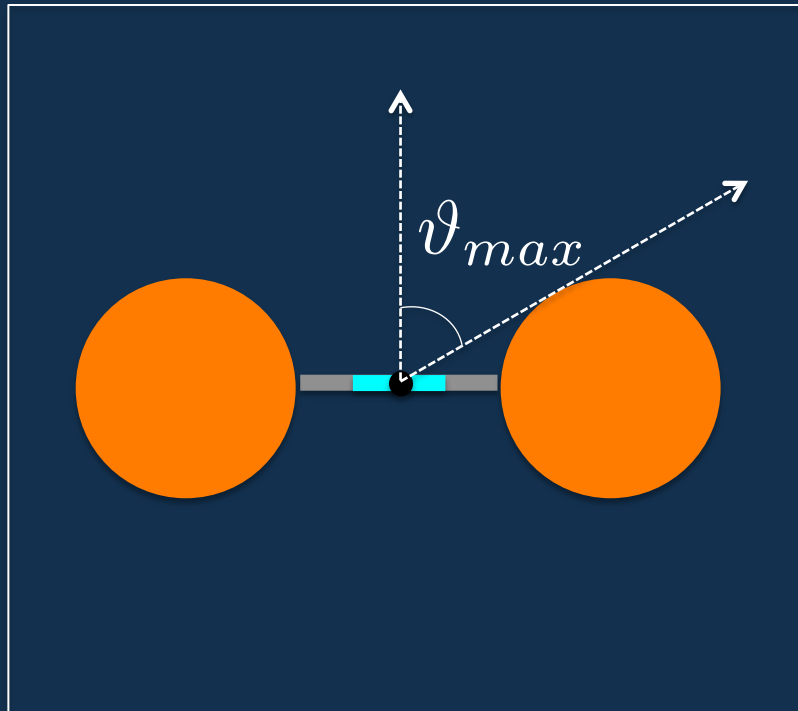
$$v_{obs} = v_{int} \sin \vartheta$$

EW[OIII] and broad lines

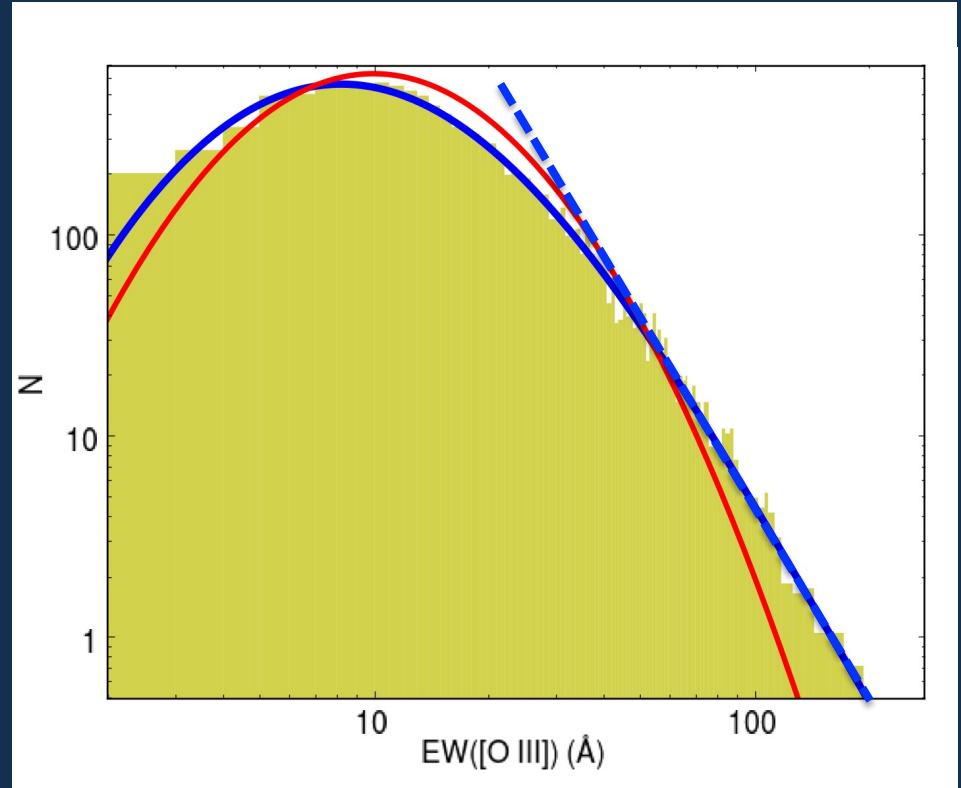
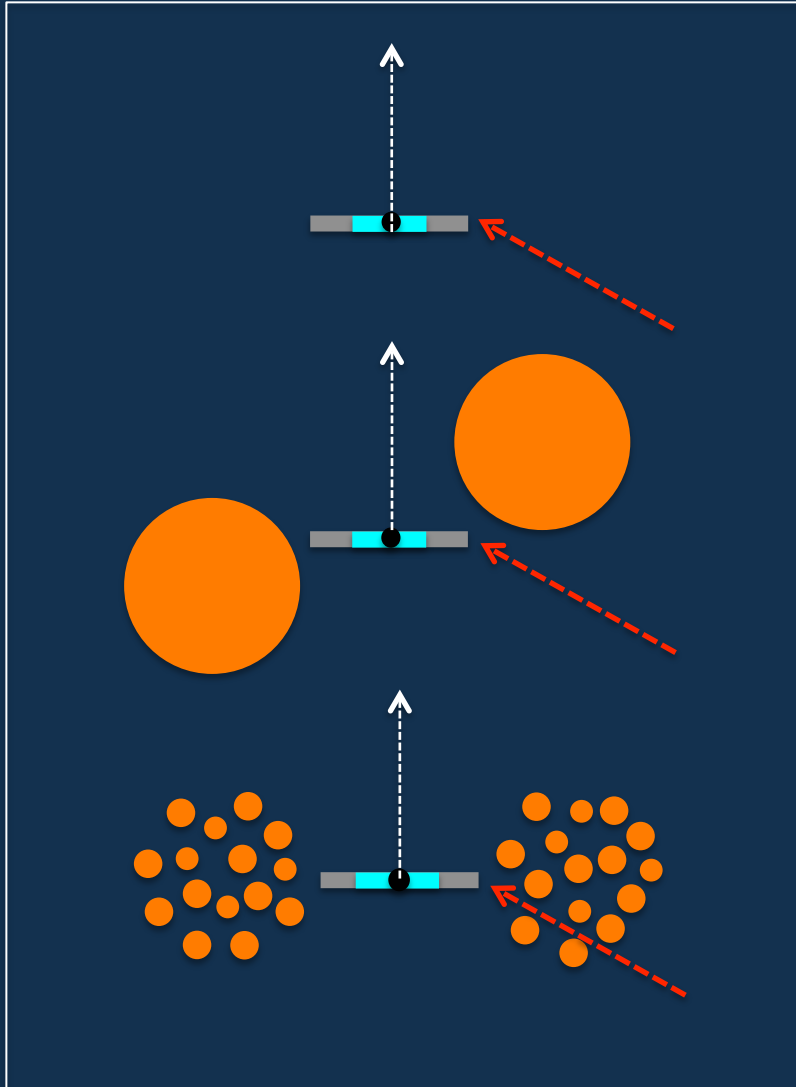
Bisogni, Marconi, Risaliti 2017



EW[OIII] and IR SED



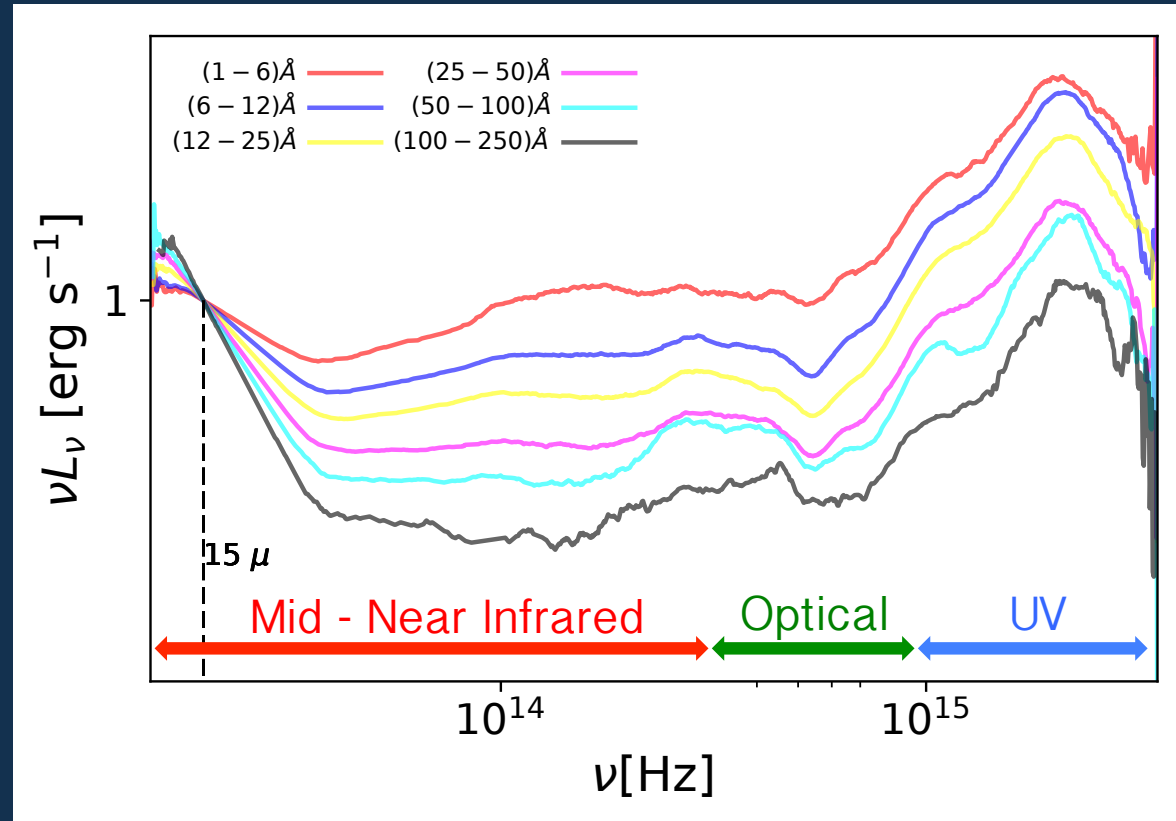
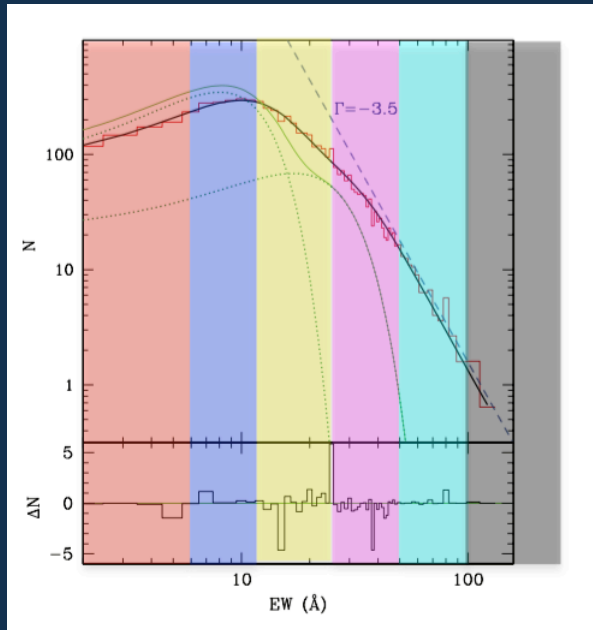
EW[OIII] and IR SED



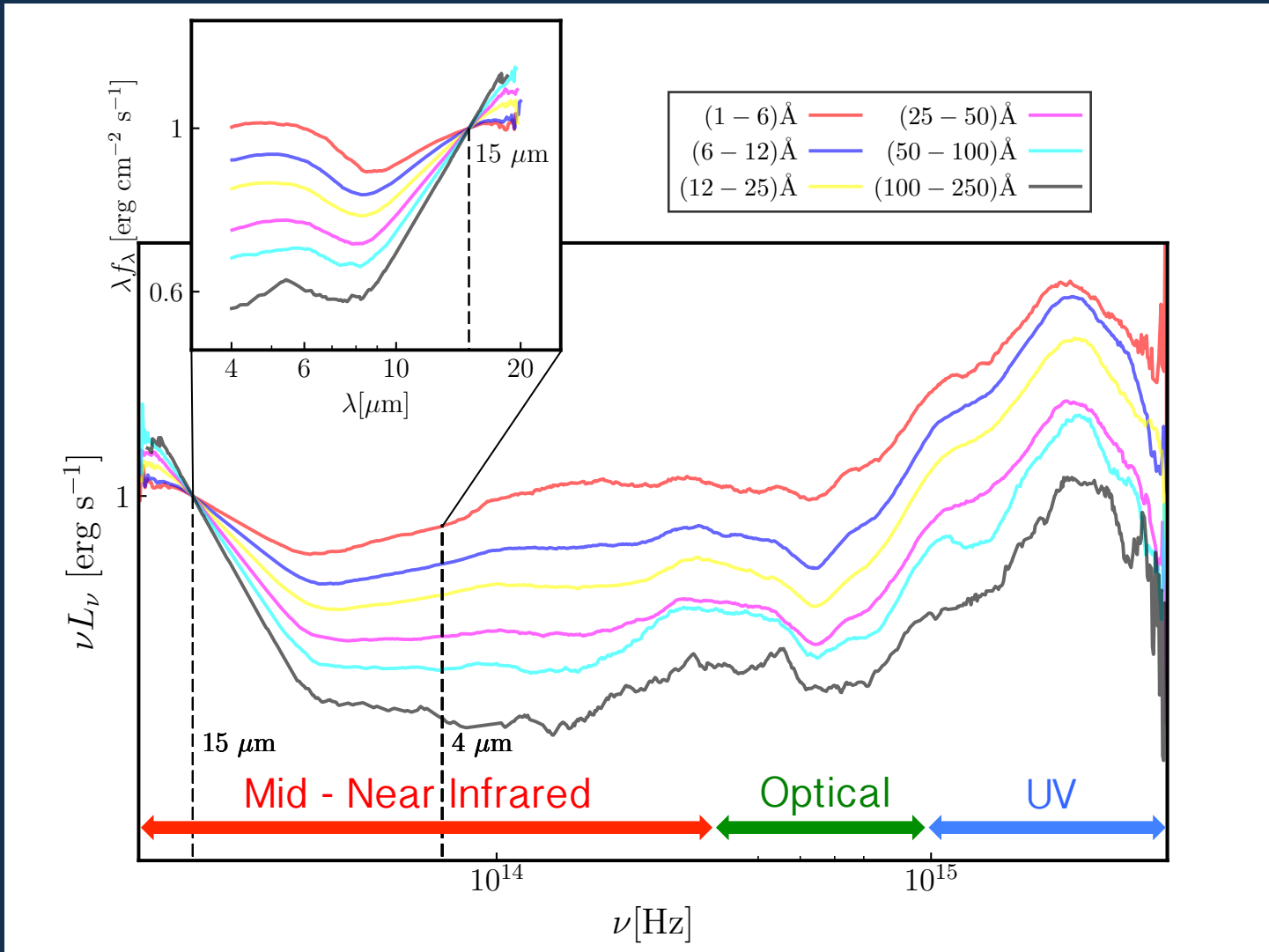
EW[OIII] and SED of quasars: the data

GALEX, SDSS, 2MASS, *WISE* photometric data

>12000 blue objects
from SDSS DR7



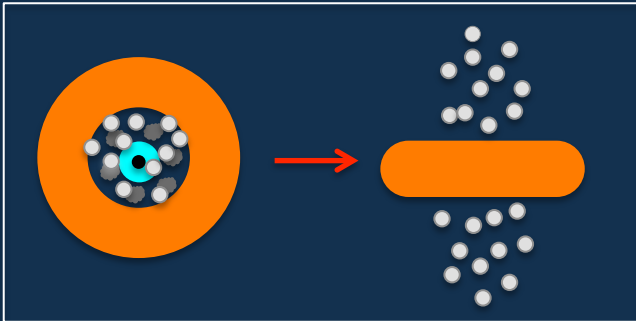
EW[OIII] and IR SED: the data



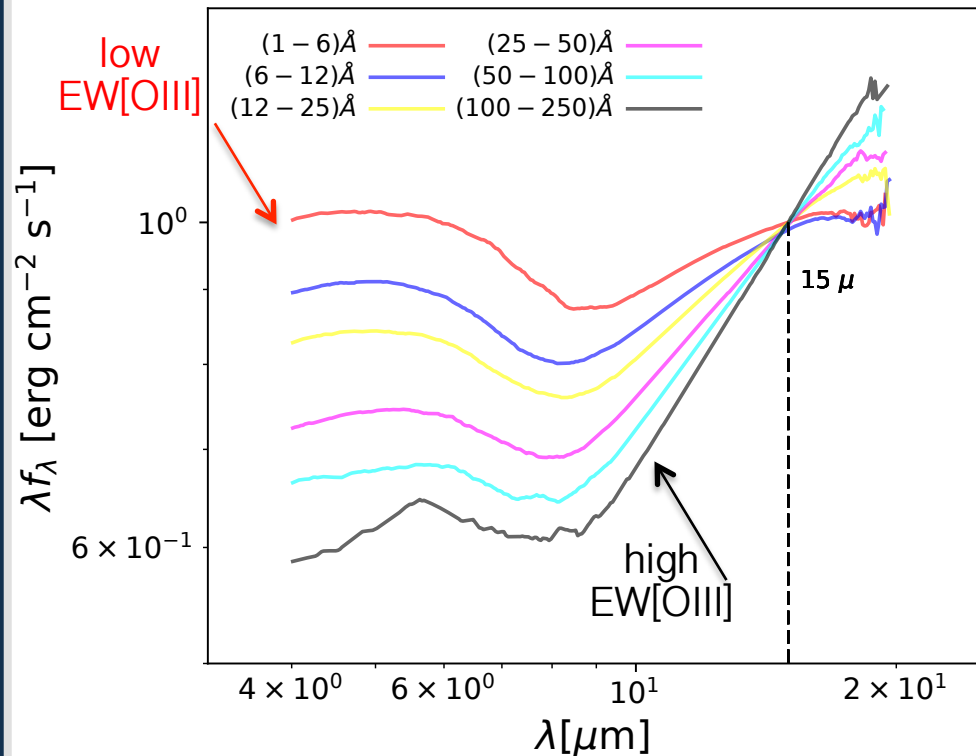
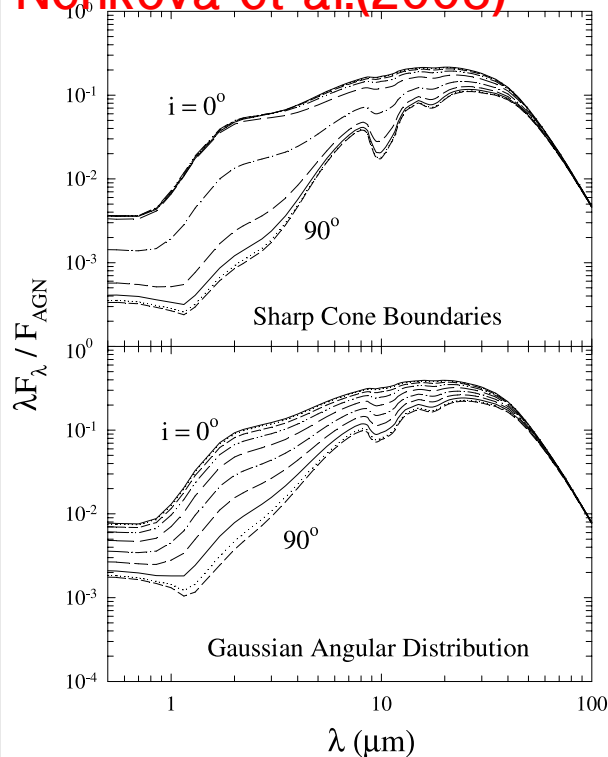
Bisogni et al. 2018, in prep.

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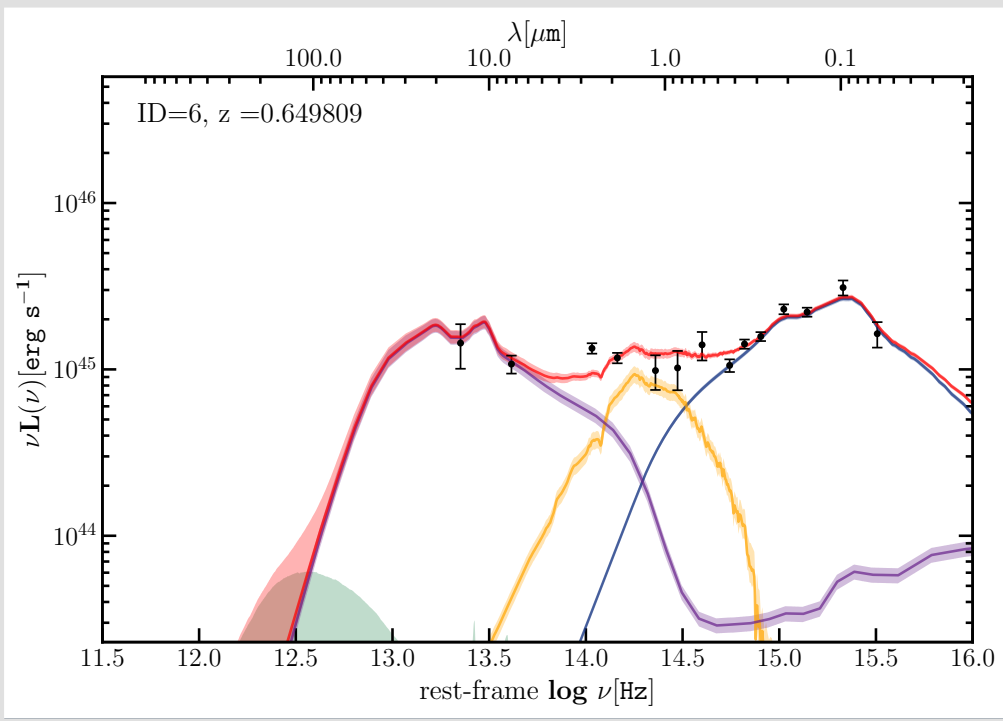
EW[OIII] and IR SED: the data



Nenkova et al.(2008)

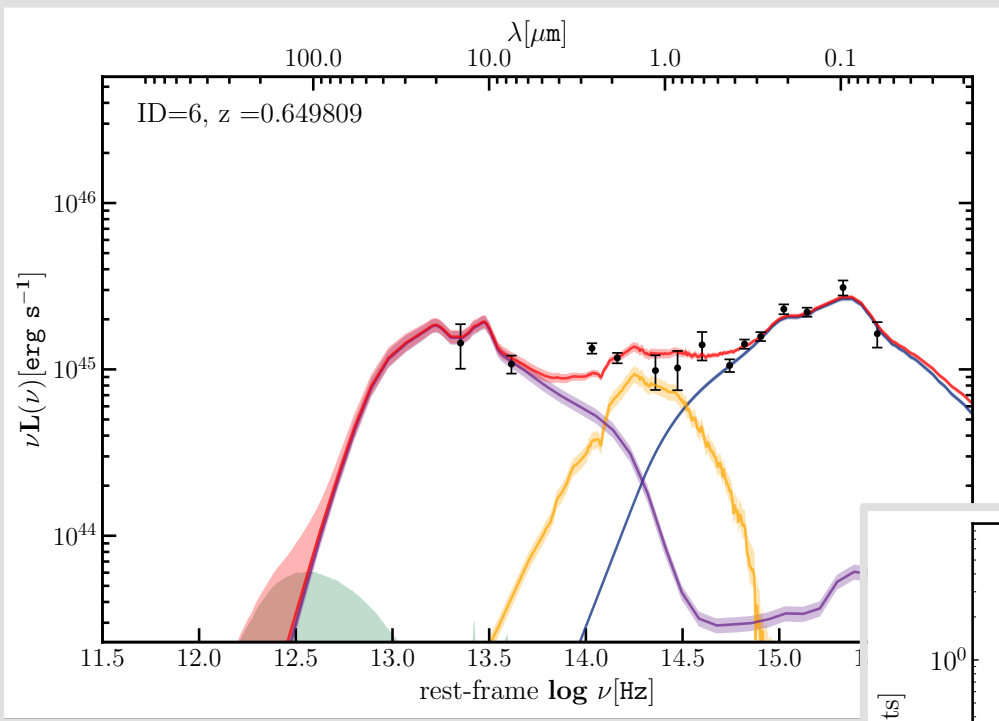


SED fitting



SED fitting with *AGNfitter*
Calistro-Rivera et al.(2016)

SED fitting



Torus templates from CLUMPY library ($>10^6$ templates)

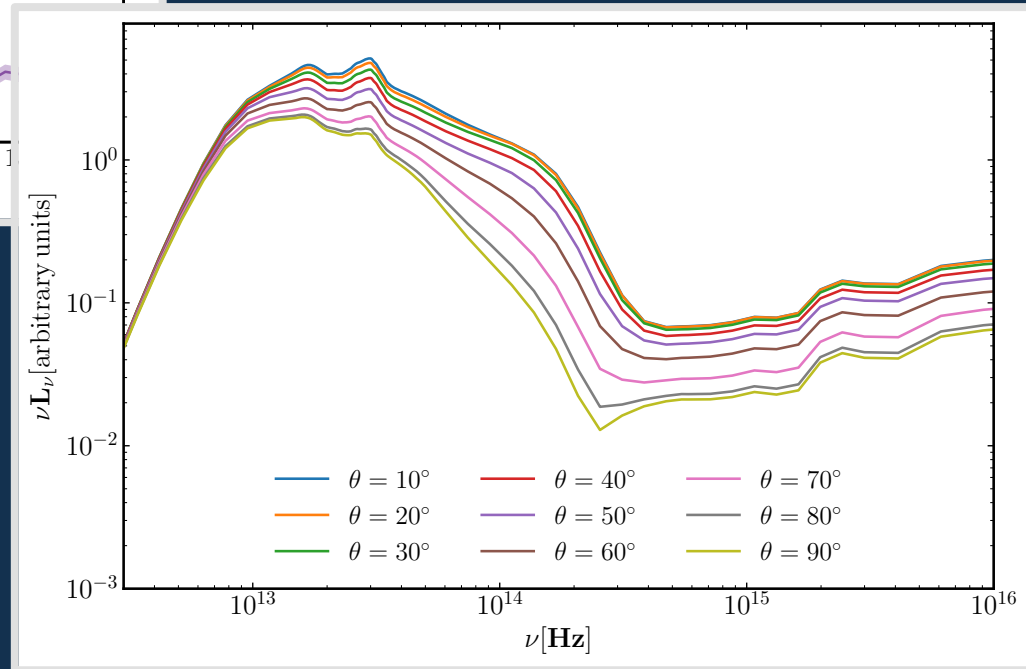
Nenkova et al. (2008)

Nikutta et al. (2009)

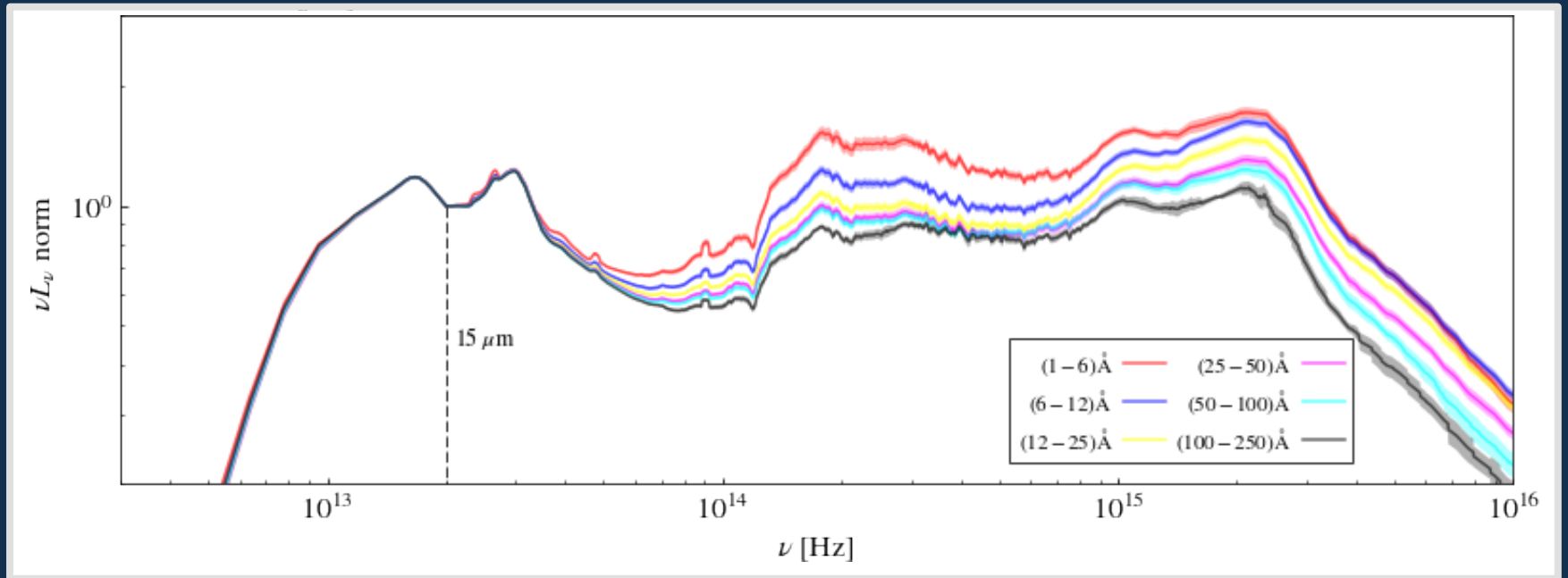
$$Y = R_0/R_d; \quad r^{-q}; \quad e^{-|\beta/\sigma|^m}$$

$$\tau_V; \quad N_0; \quad \vartheta$$

SED fitting with *AGNfitter*
Calistro-Rivera et al. (2016)

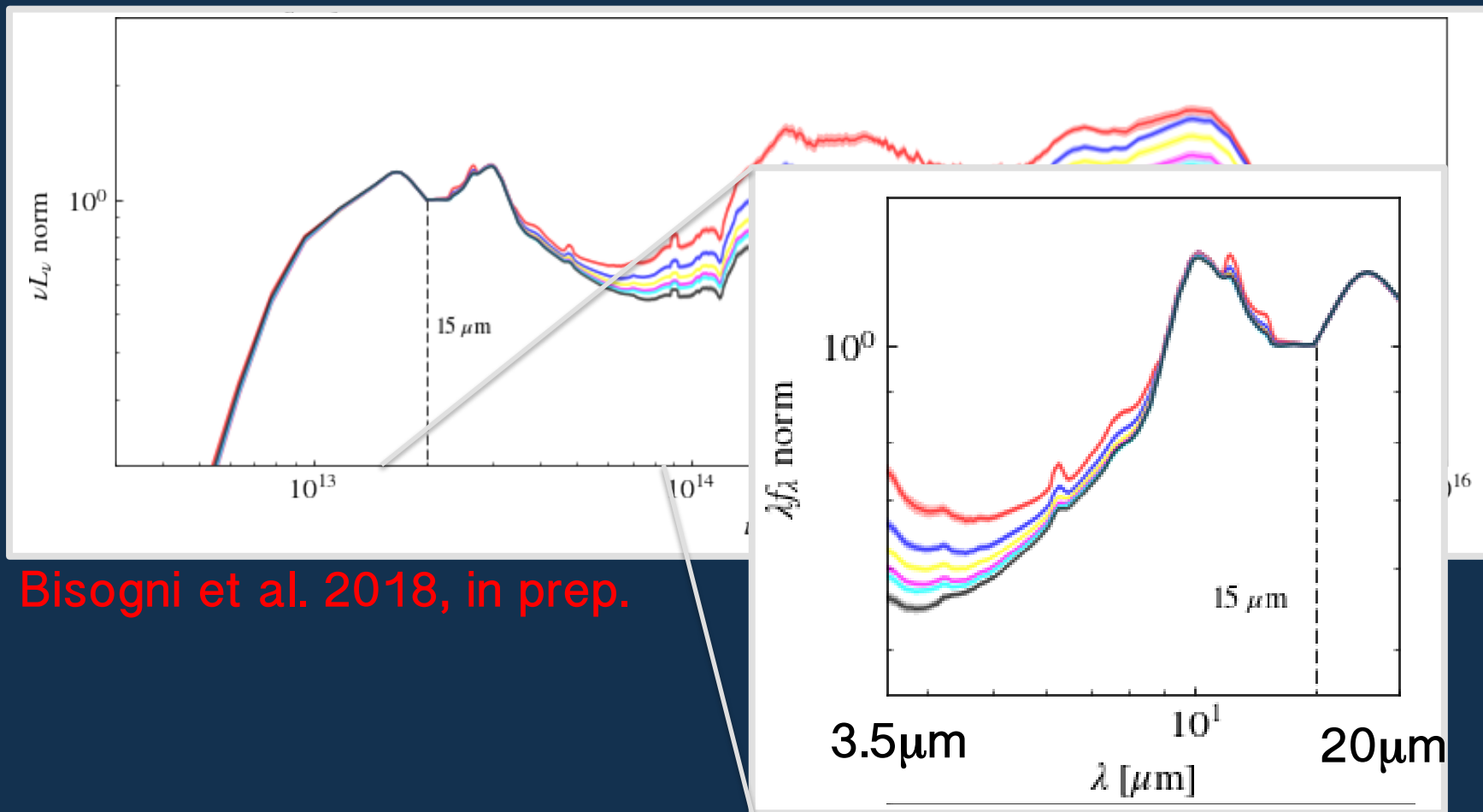


Results

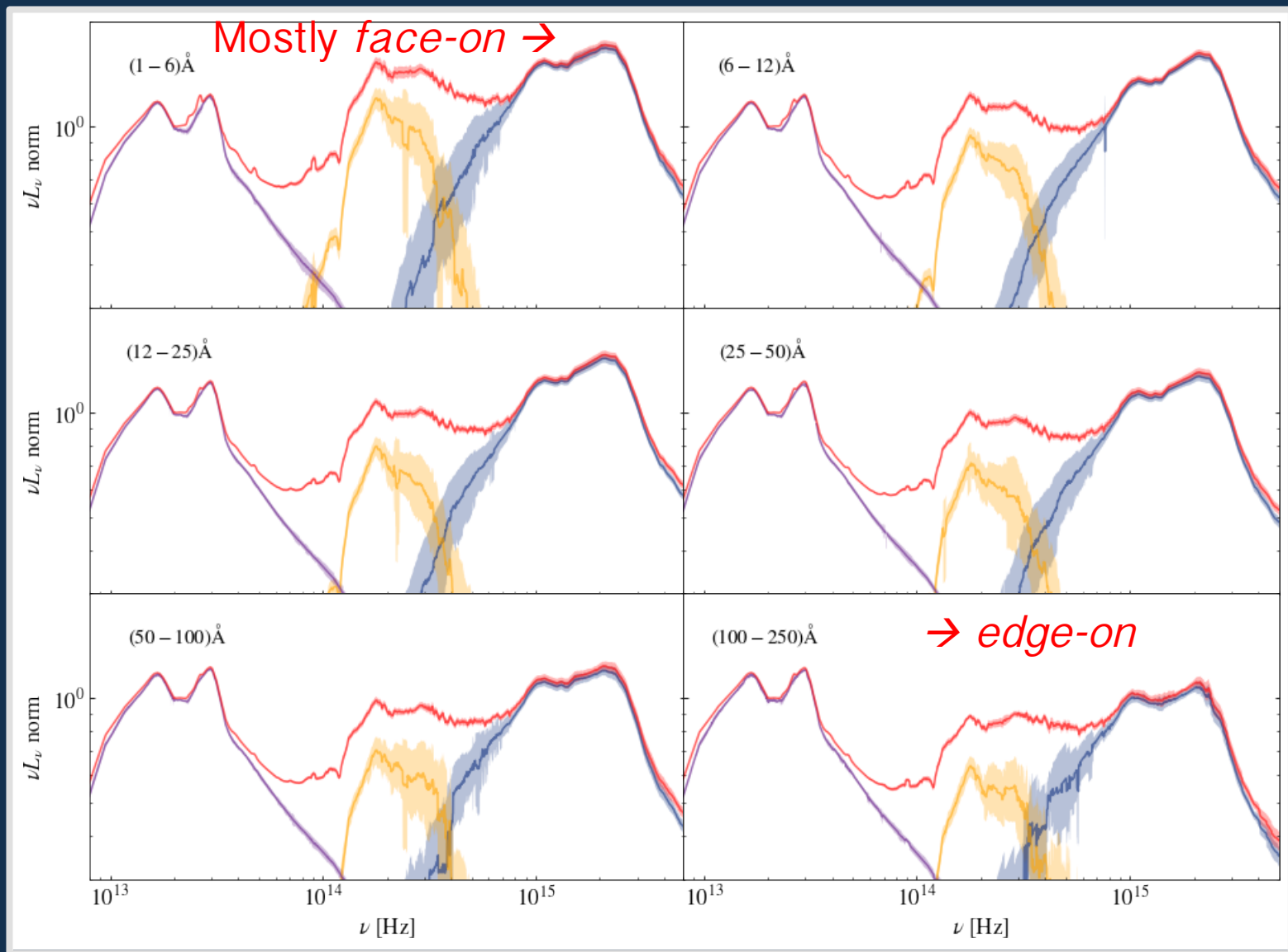


Bisogni et al. 2018, in prep.

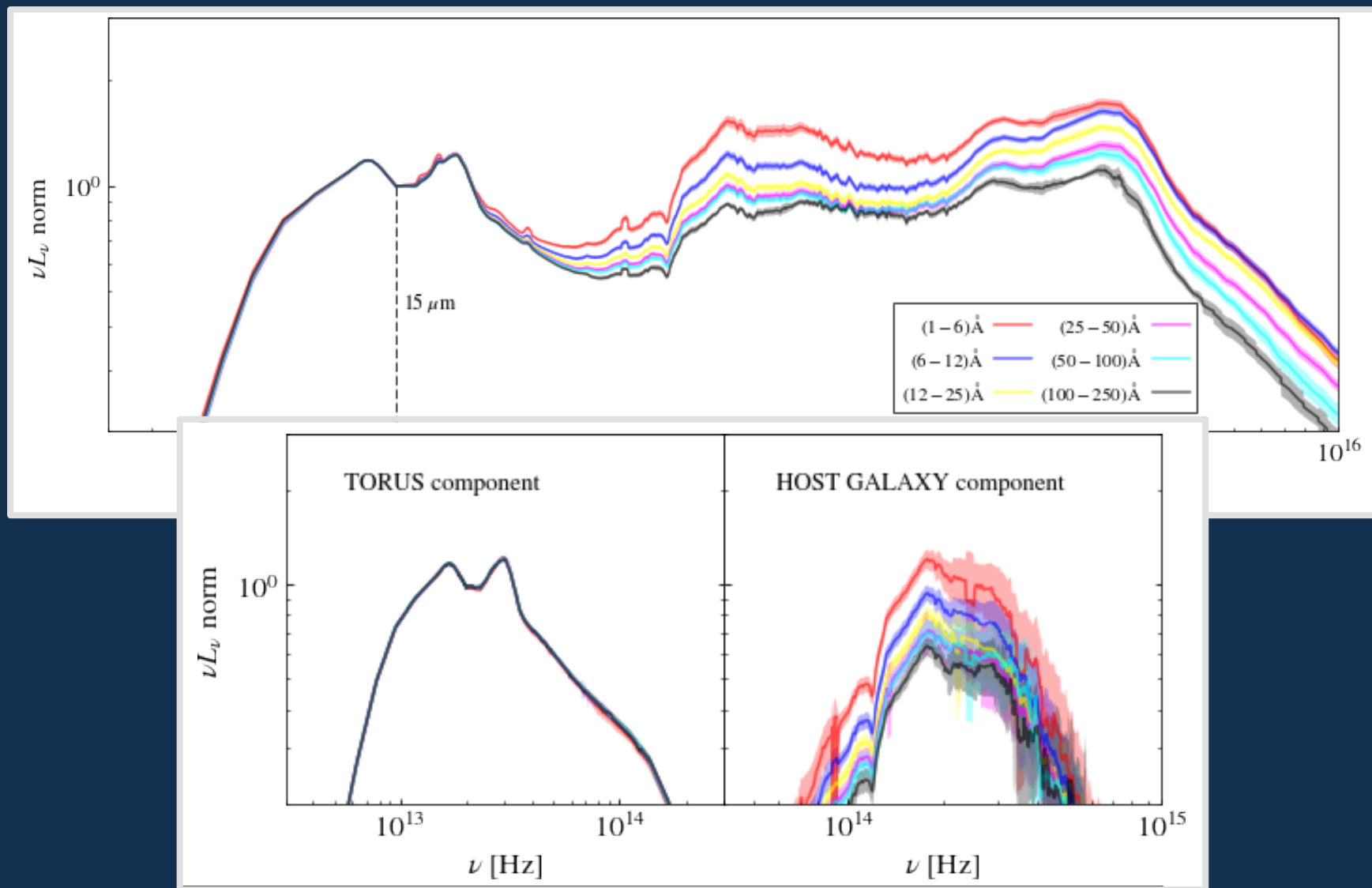
Results



Results



Results

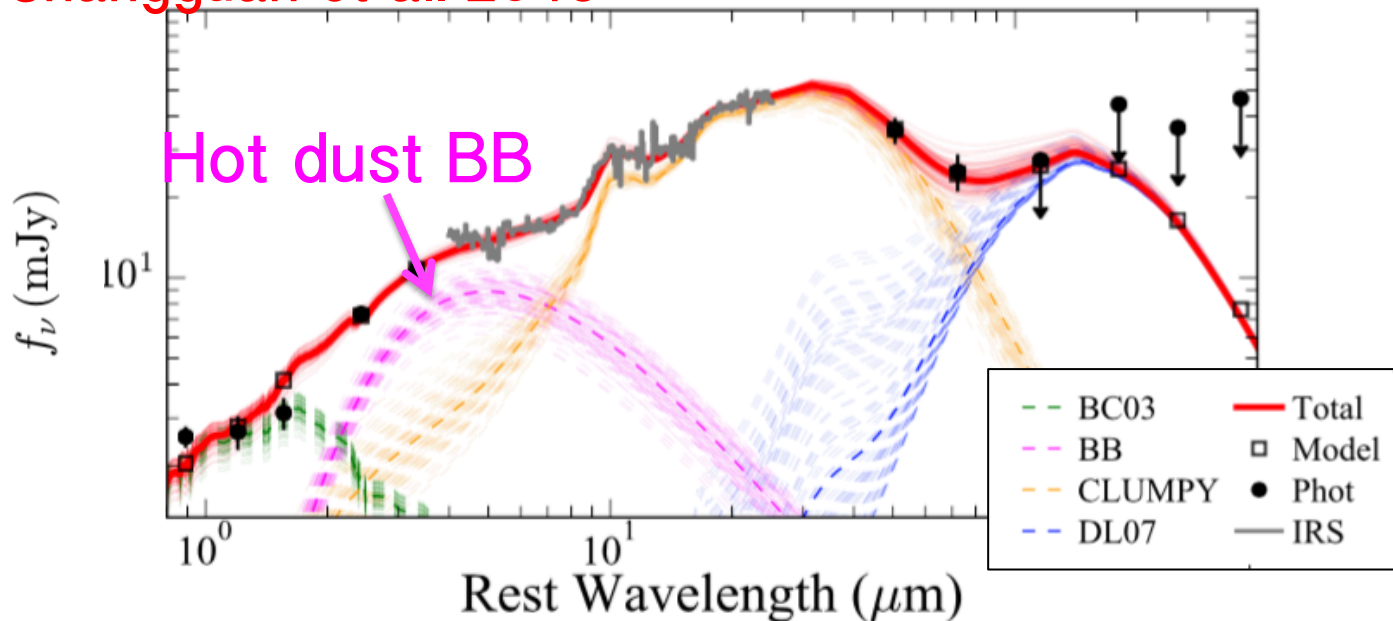


A missing component?

Hot dust Black Body $T \sim 1000\text{-}1900\text{ K}$

Mor et al. 2009-2011, Deo et al. 2011,
Mor & Netzer 2012, Garcia-Gonzalez et
al. 2017, Hoenig & Kishimoto 2017...

Shangguan et al. 2018

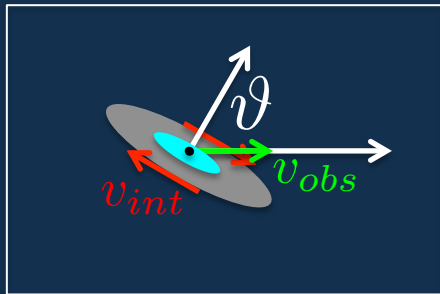


Conclusions

Knowing source orientation allows us to:

→ optical:

- Connect emissions shape to geometry
→ morphological study of unresolved, inner regions
- Correct virial mass estimates for non edge-on sources



$$M_{\bullet} = f \frac{v_{int}^2 R_{BLR}}{G} = f \frac{\left(\frac{v_{obs}}{\sin i}\right)^2 R_{BLR}}{G}$$

→ IR:

- Data in agreement with models in literature:
→ torus clumpy and co-axial with disk and BLR
- Further analysis is needed to disentangle the torus contribution

