

Orientation Effects on Spectral Emission Features of Quasars

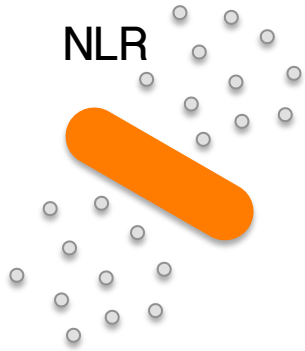
Susanna Bisogni

*Harvard – Smithsonian Center for Astrophysics
INAF – Osservatorio Astrofisico di Arcetri*

In collaboration with:
Alessandro Marconi, Guido Risaliti and Elisabeta Lusso

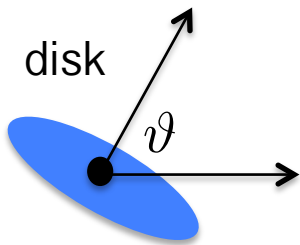


EW[OIII]: orientation in quasars



$L_{[OIII]}$: - no contamination from non-AGN processes (*Kauffmann et al. 2003*)

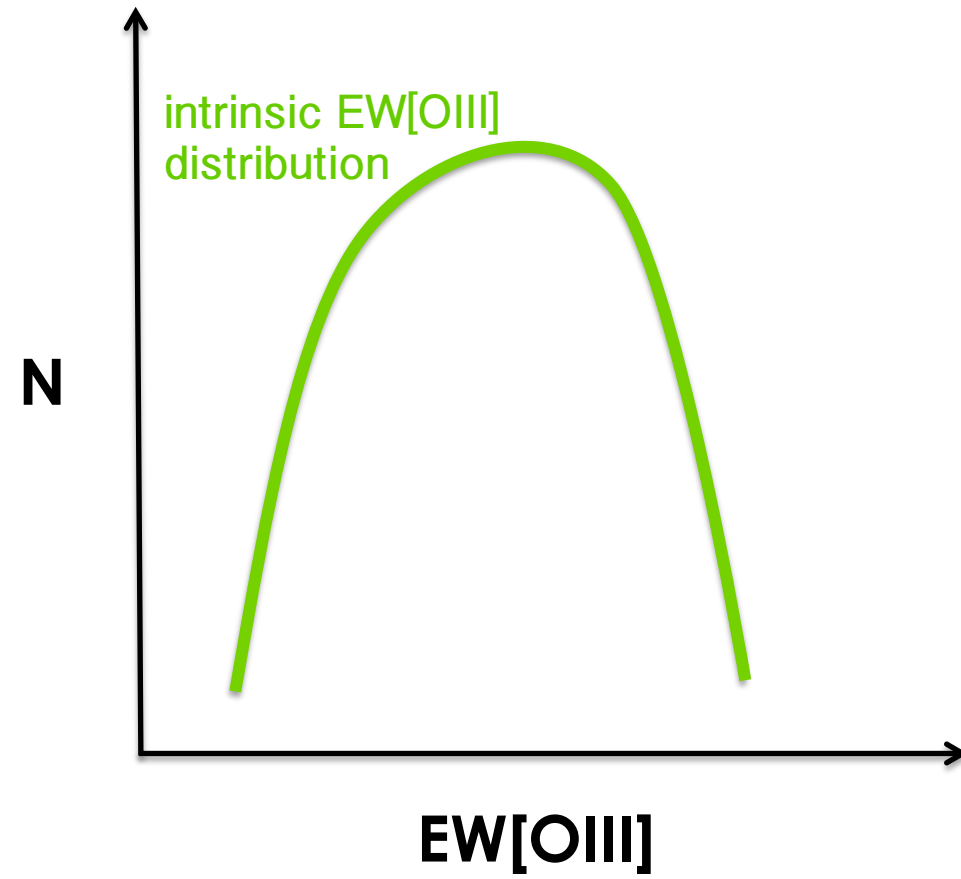
- ISOTROPIC (*Mulchaey et al. 1994*)
if compared to disk and BLR emissions
(*di Serego Alighieri et al. 1997*)



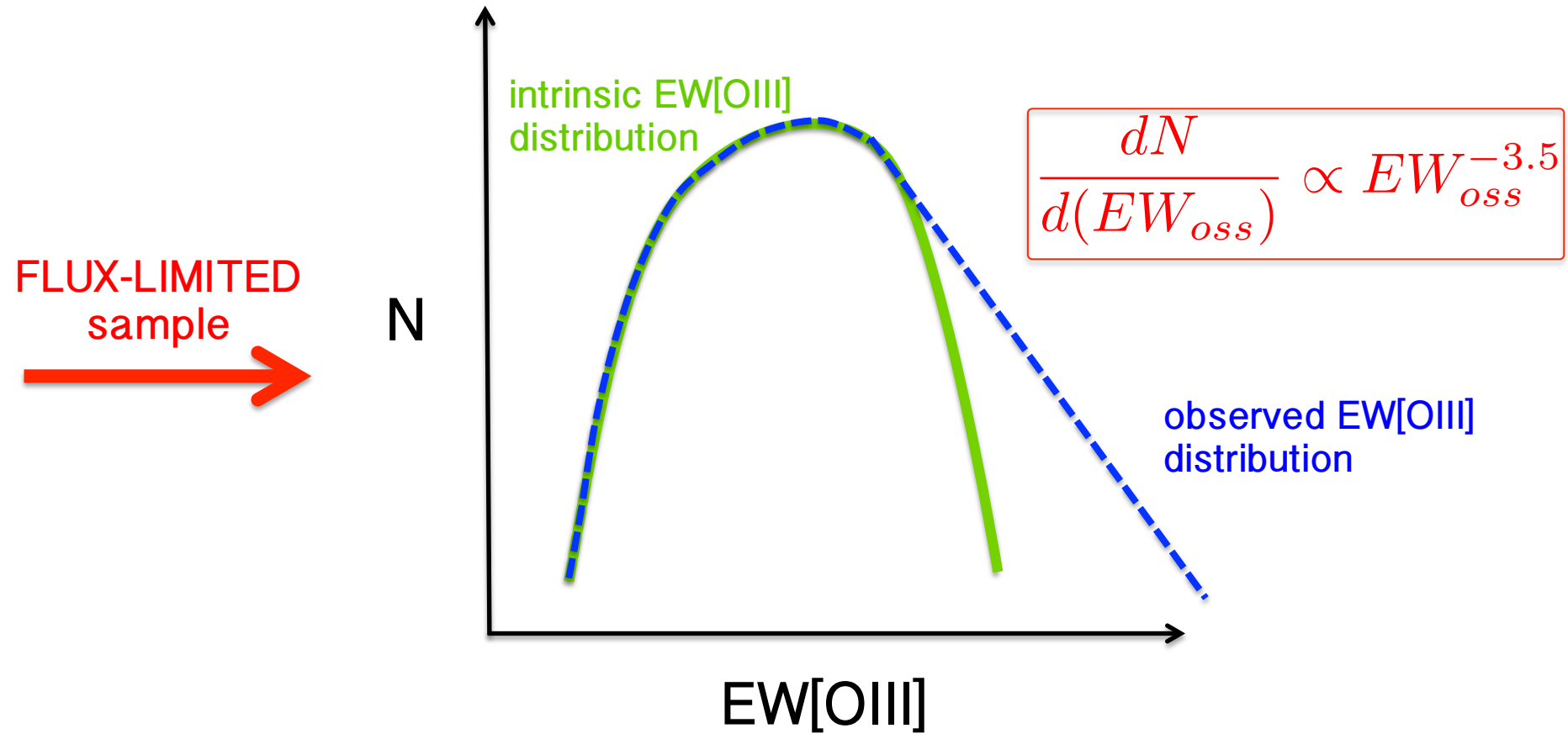
$$L_{d_{oss}} = L_{d_{int}} \cos \vartheta$$

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

EW[OIII]: intrinsic distribution



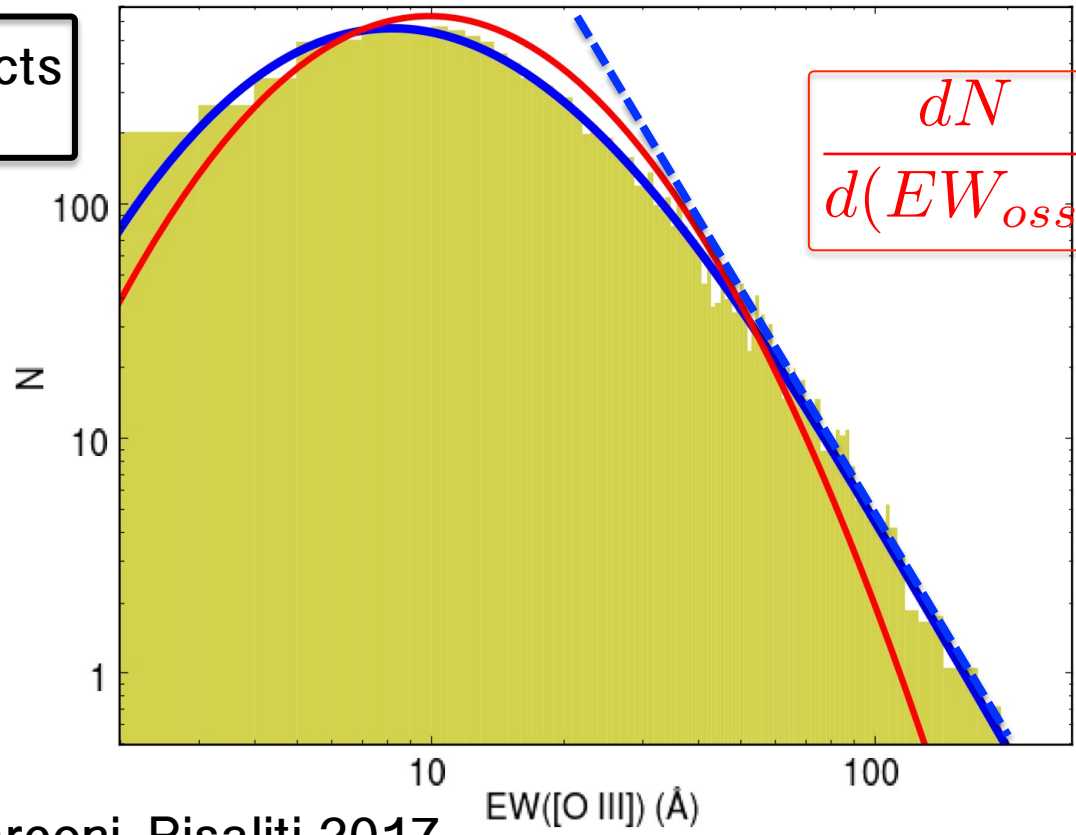
EW[OIII]: observed distribution



EW[OIII]: observed distribution

~ 12000 blue objects
SDSS DR7

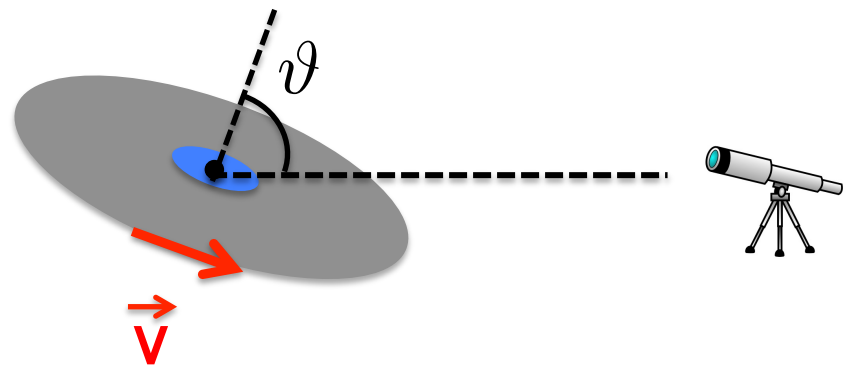
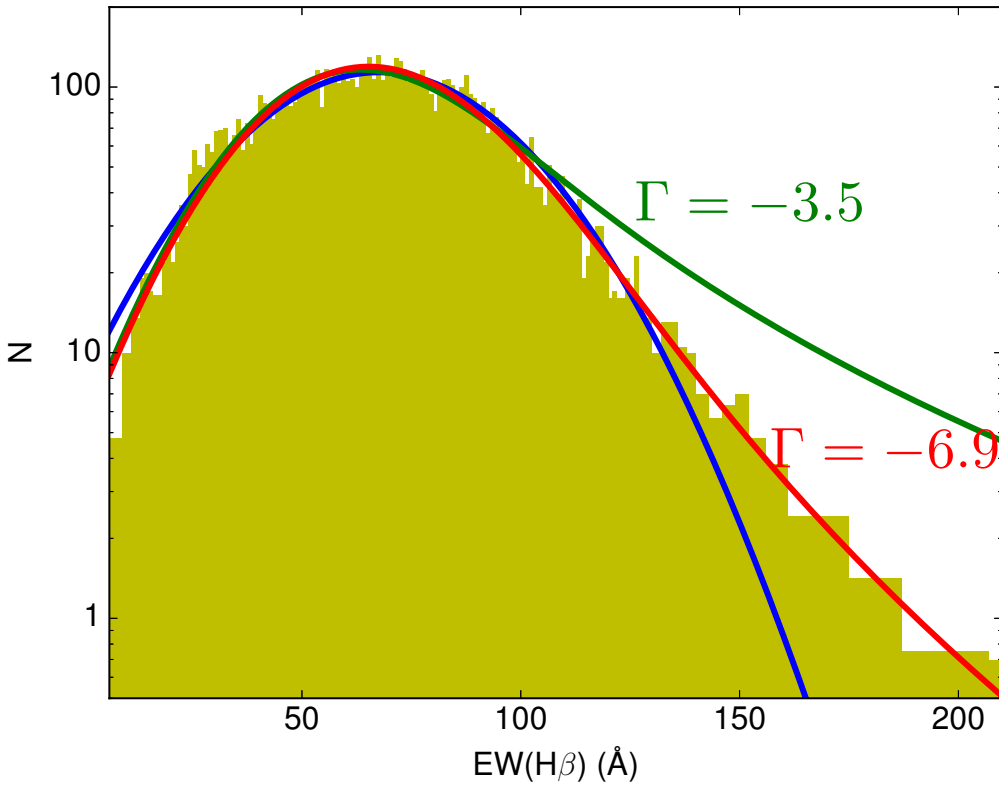
FLUX-LIMITED
sample
→



$$\frac{dN}{d(EW_{oss})} \propto EW_{oss}^{-3.5}$$

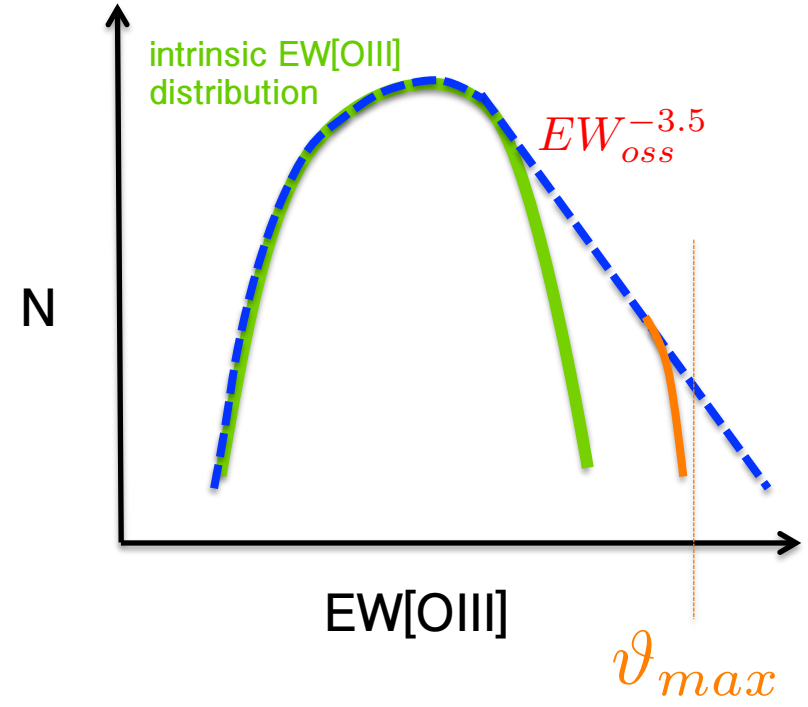
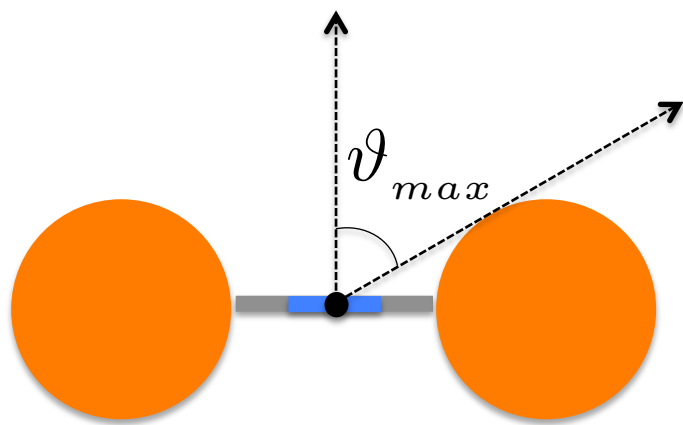
EW[OIII] vs Broad Lines EWs

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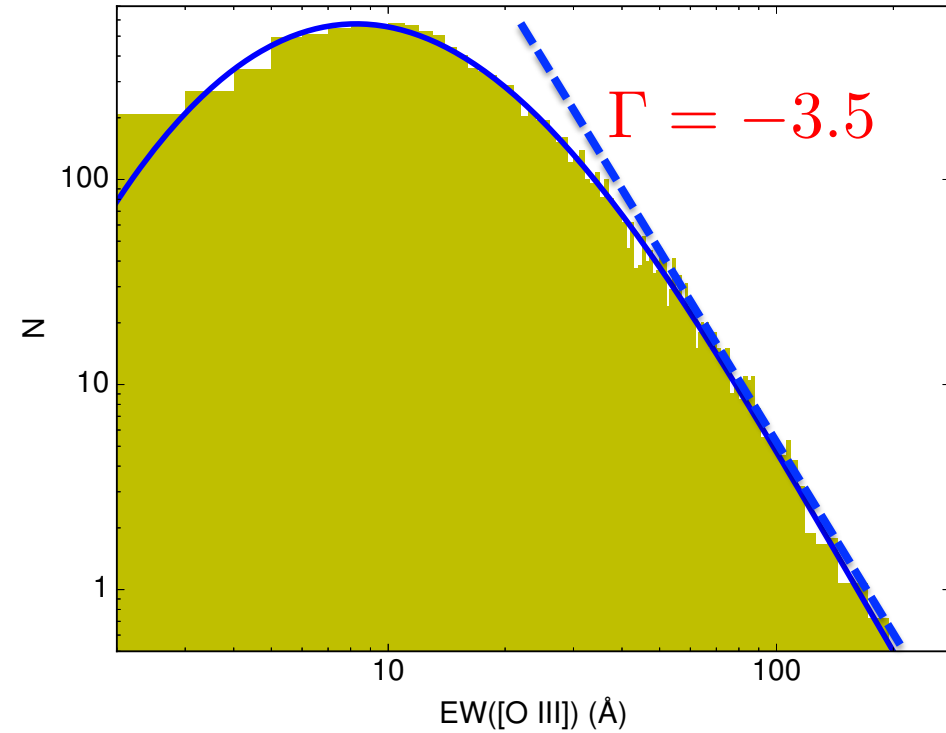
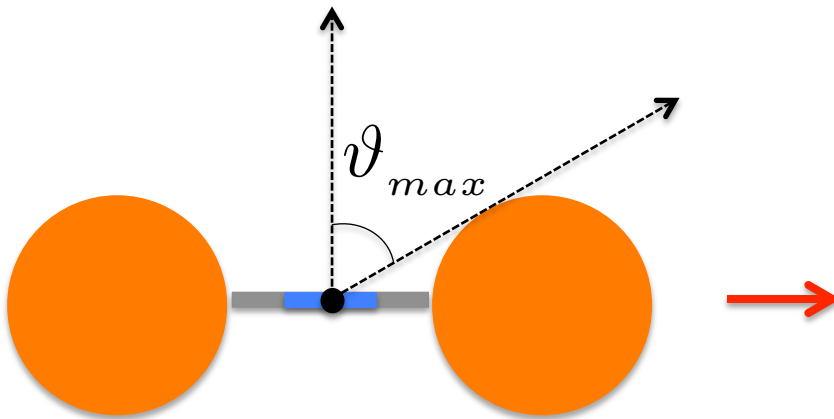
$$L_{BLR_{obs}} = L_{BLR_{int}} \cos \vartheta$$

EW[OIII]: a missing torus?



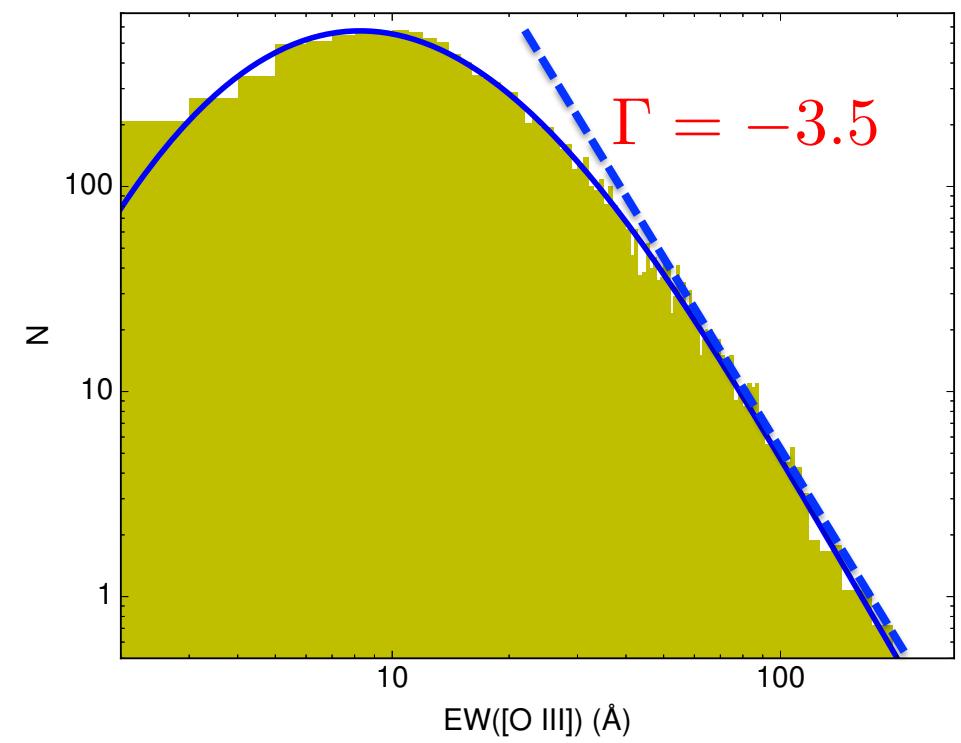
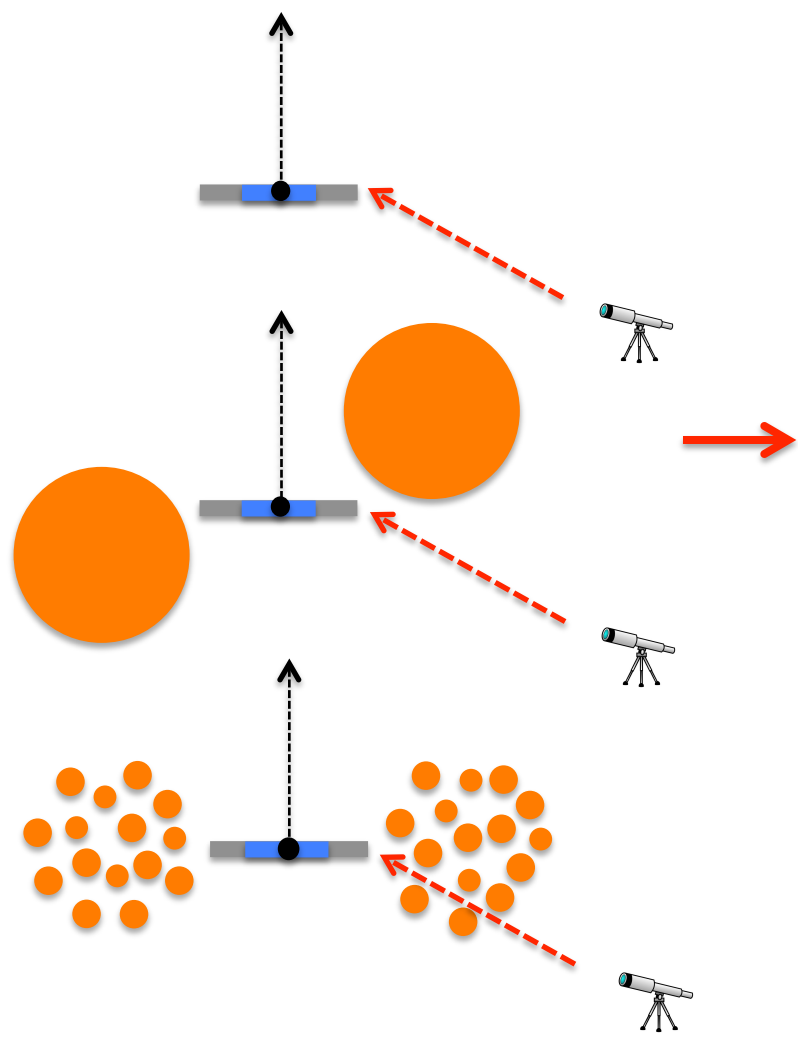
EW[OIII]: a missing torus?

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EW[OIII]: a missing torus?

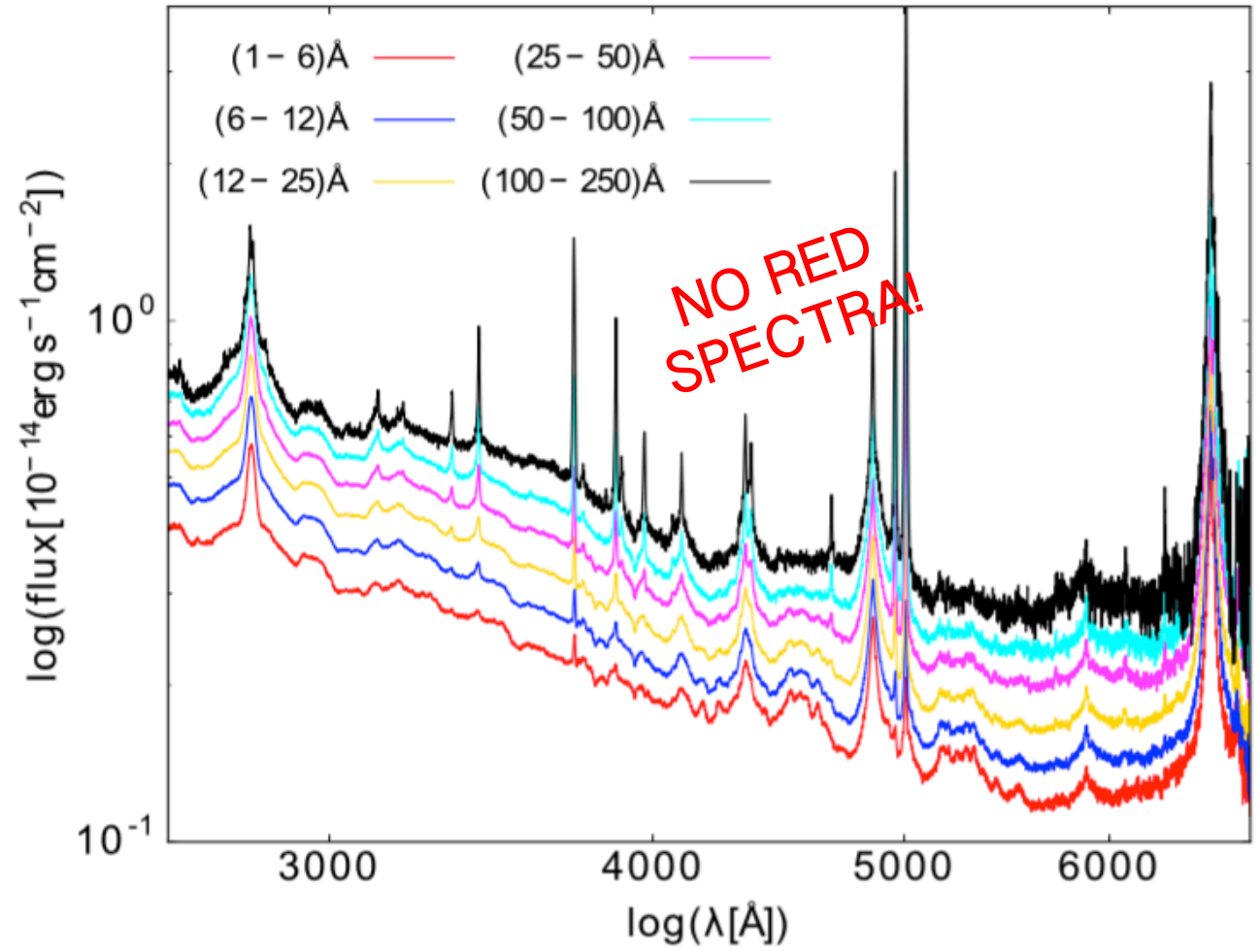
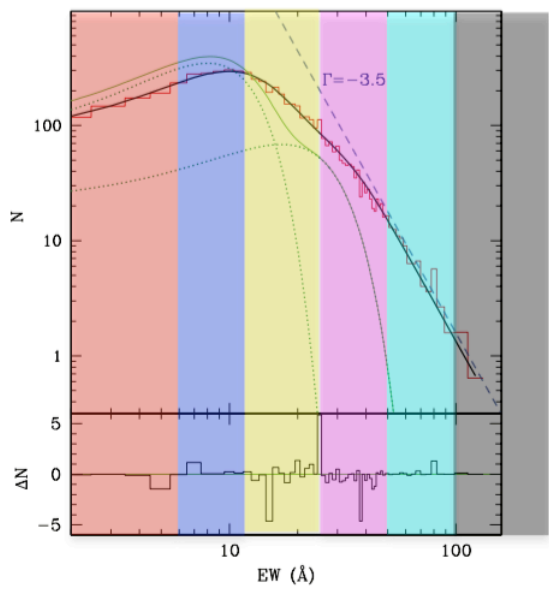
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EW[OIII]: method

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SDSS DR7



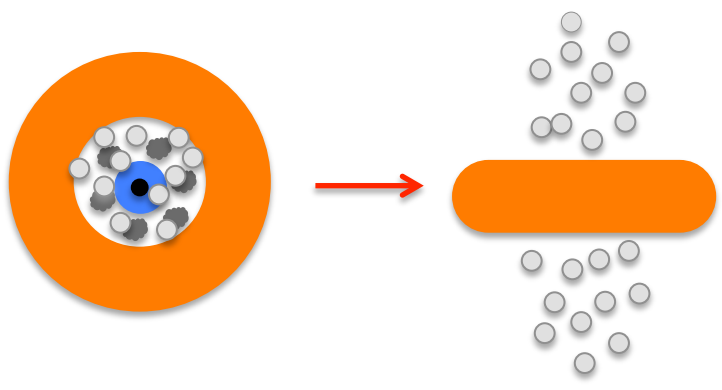
EW[OIII]: results for Narrow Lines



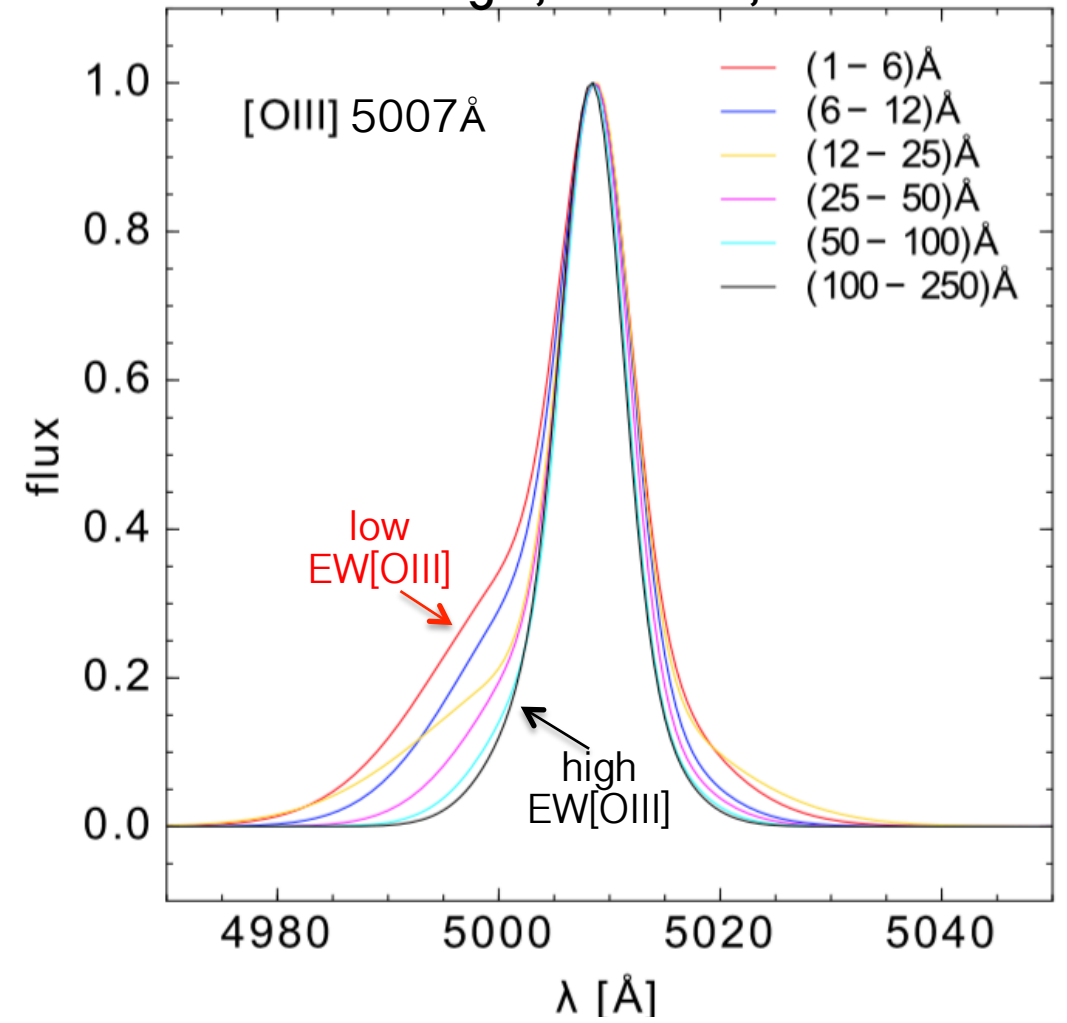
$$v_{oss} = v_{out} \cos \vartheta$$

EW[OIII]: results for Narrow Lines

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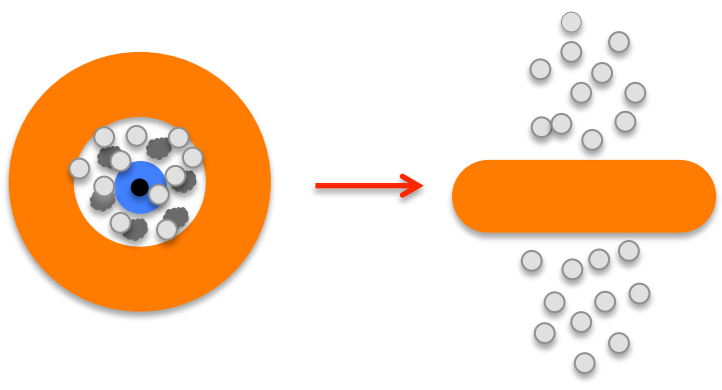


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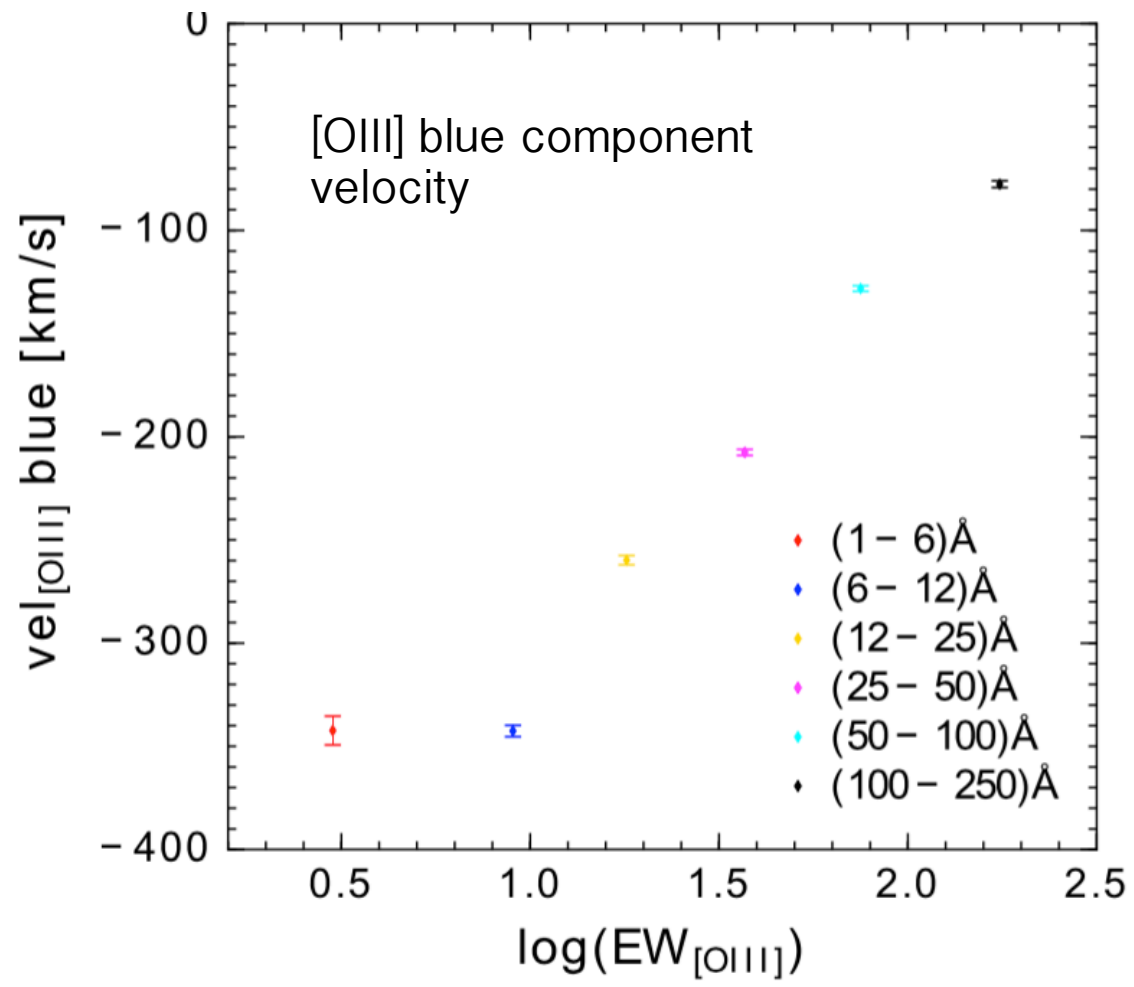


EW[OIII]: results for Narrow Lines

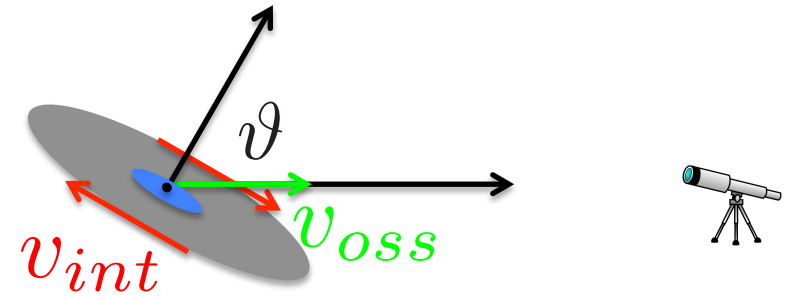
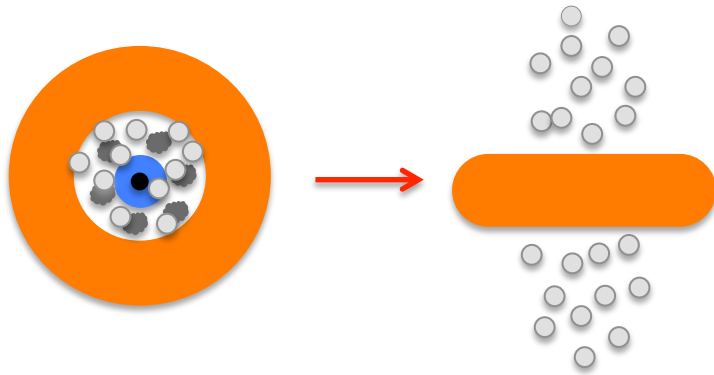
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$$v_{oss} = v_{out} \cos \vartheta$$



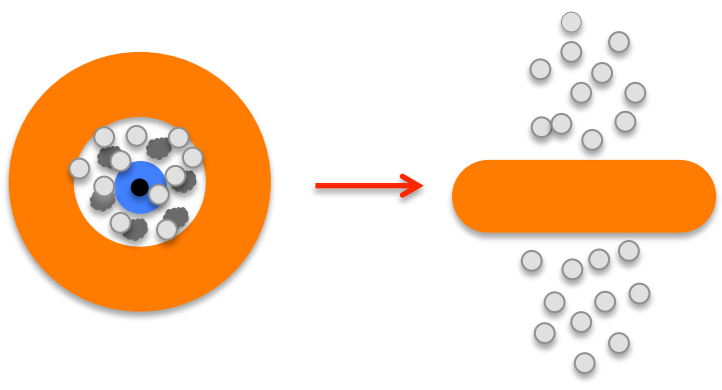
EW[OIII]: results for Broad Lines



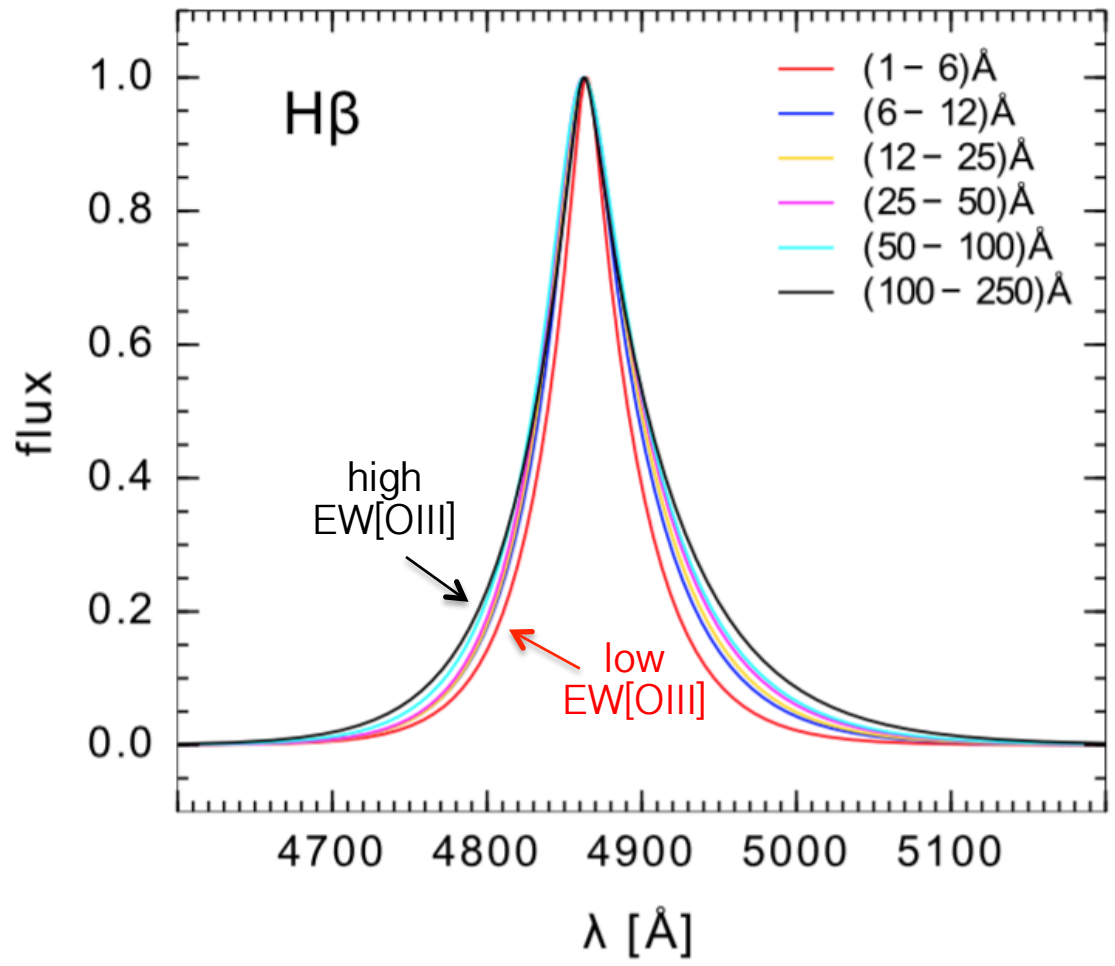
$$v_{oss} = v_{rot} \sin \vartheta$$

EW[OIII]: results for Broad Lines

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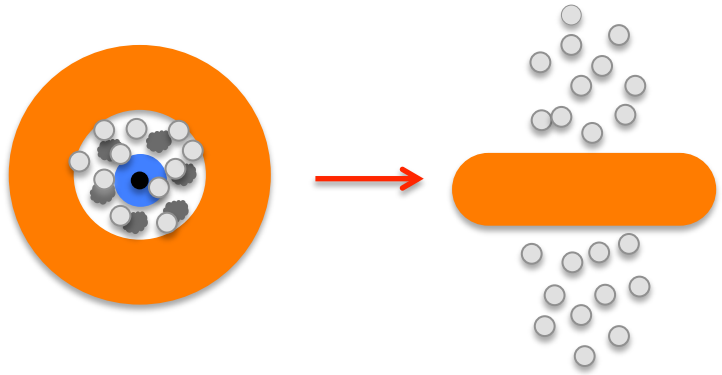


$$v_{oss} = v_{rot} \sin \vartheta$$



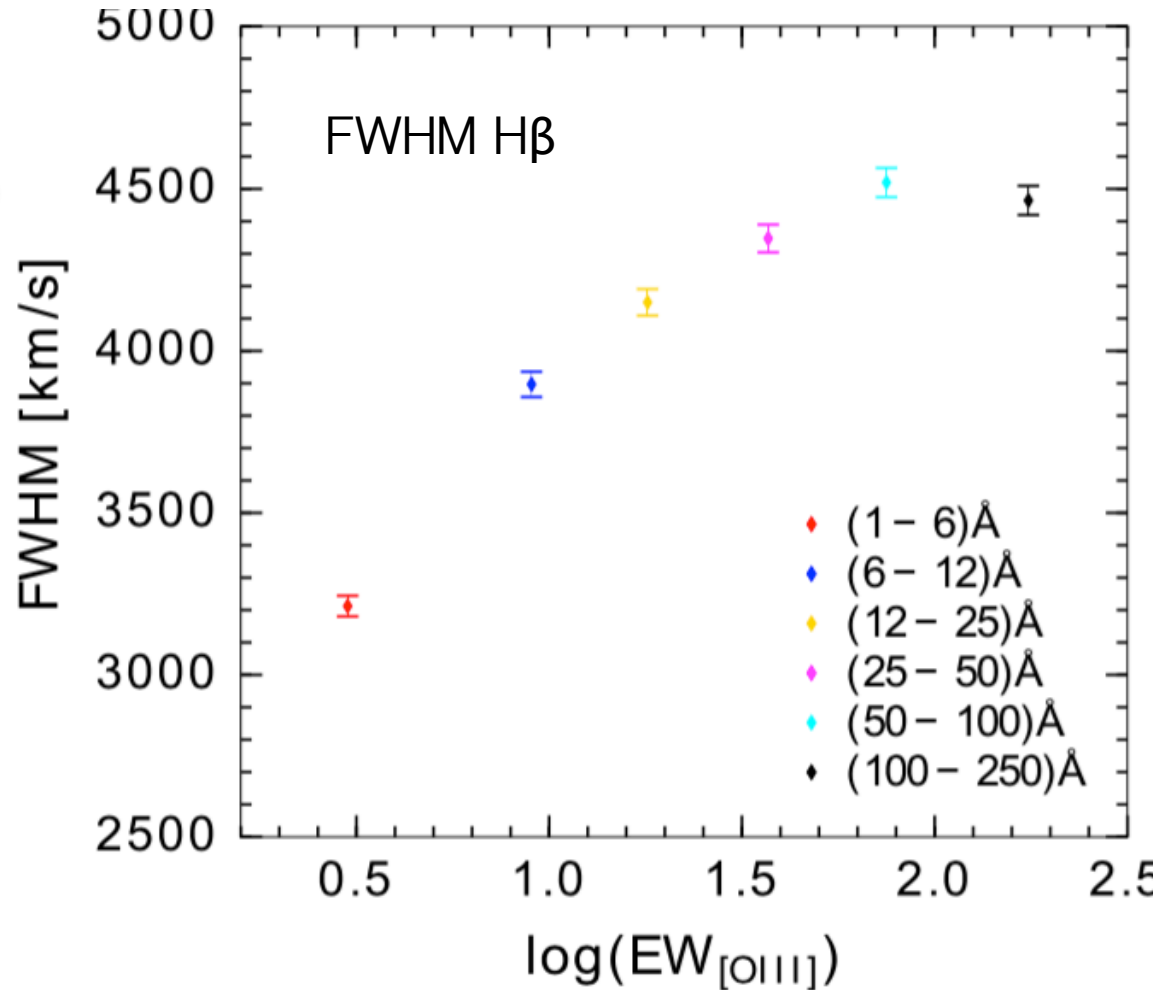
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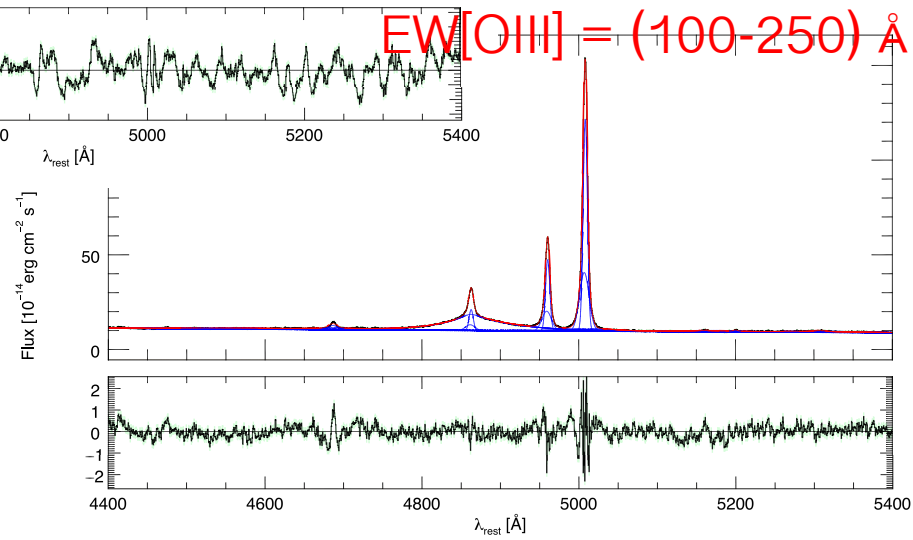
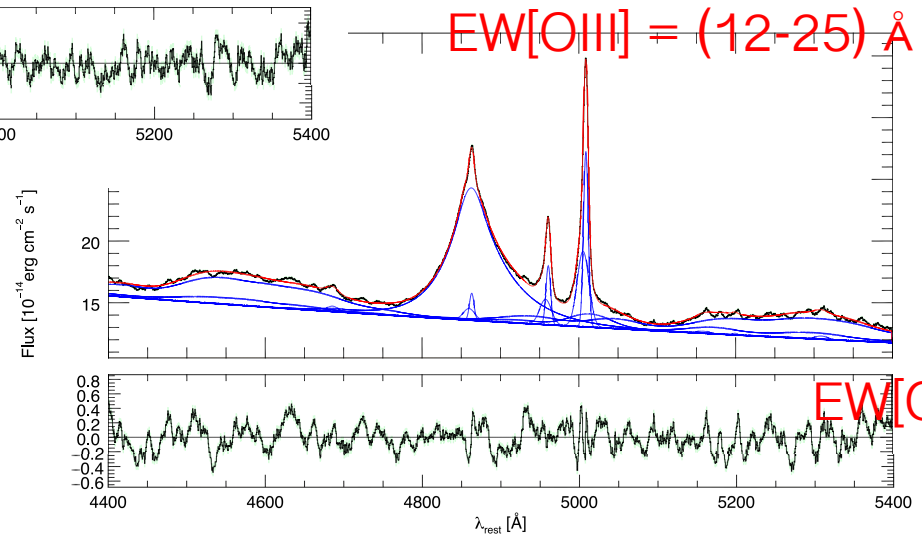
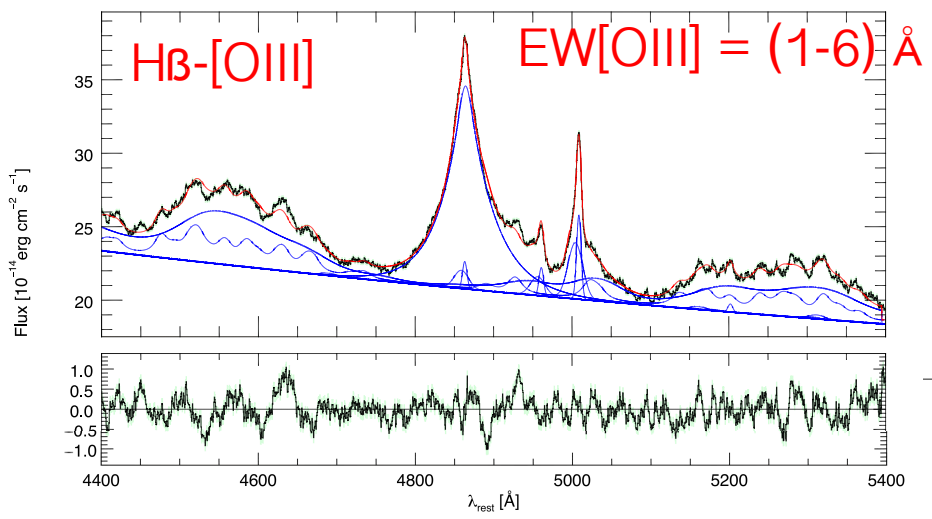


$$v_{oss} = v_{rot} \sin \vartheta$$

Same results for MgII and H α !!



EW[OIII]: eigenvector 1



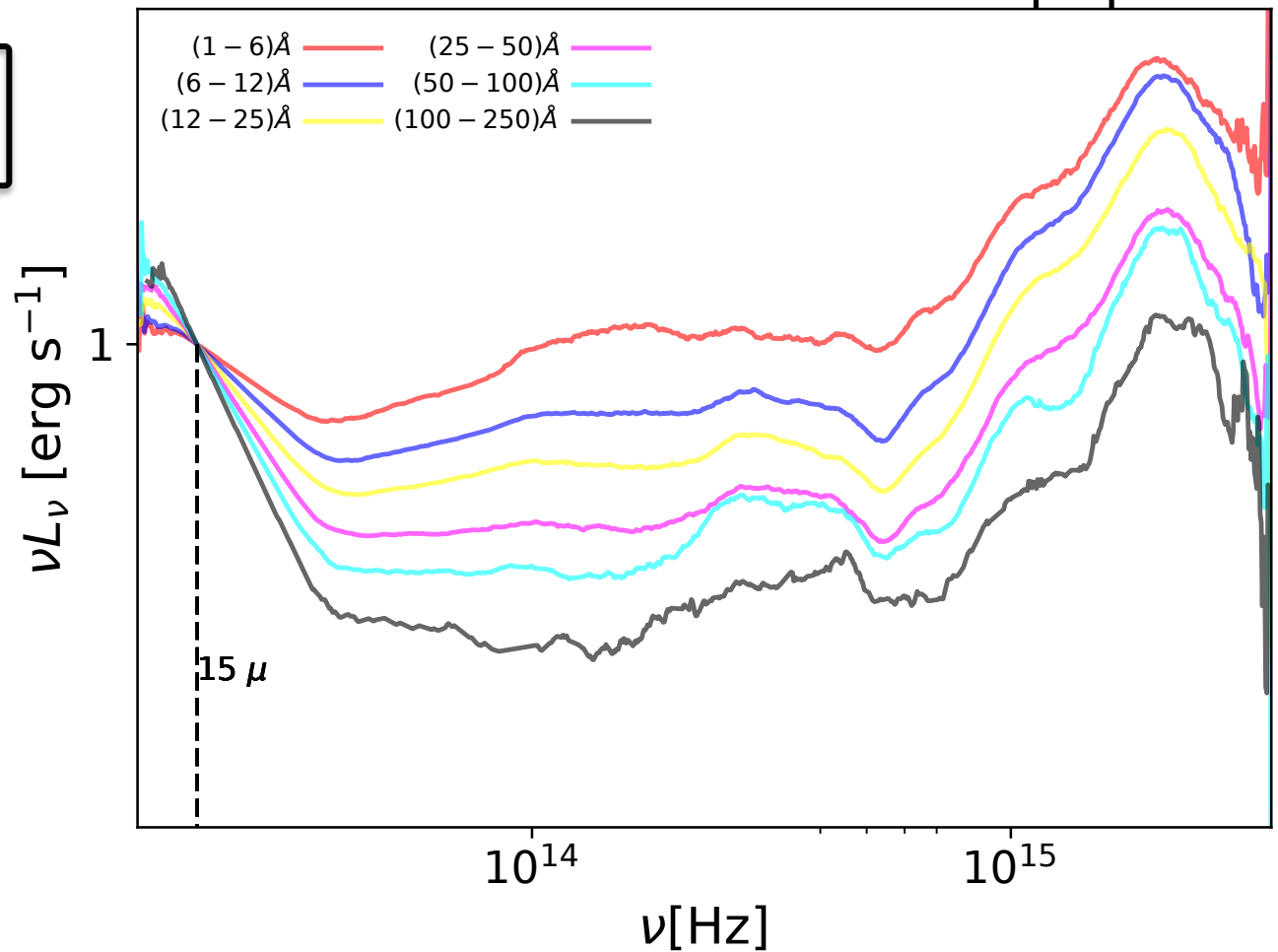
EW[OIII]: results for the torus

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in preparation

~ 12000 blue objects
SDSS DR7

- GALEX FUV, NUV
- SDSS *ugriz*
- 2MASS J, H, K
- WISE 3.4, 4.6, 12, 22 μm

Spectral Energy
Distrubution
→



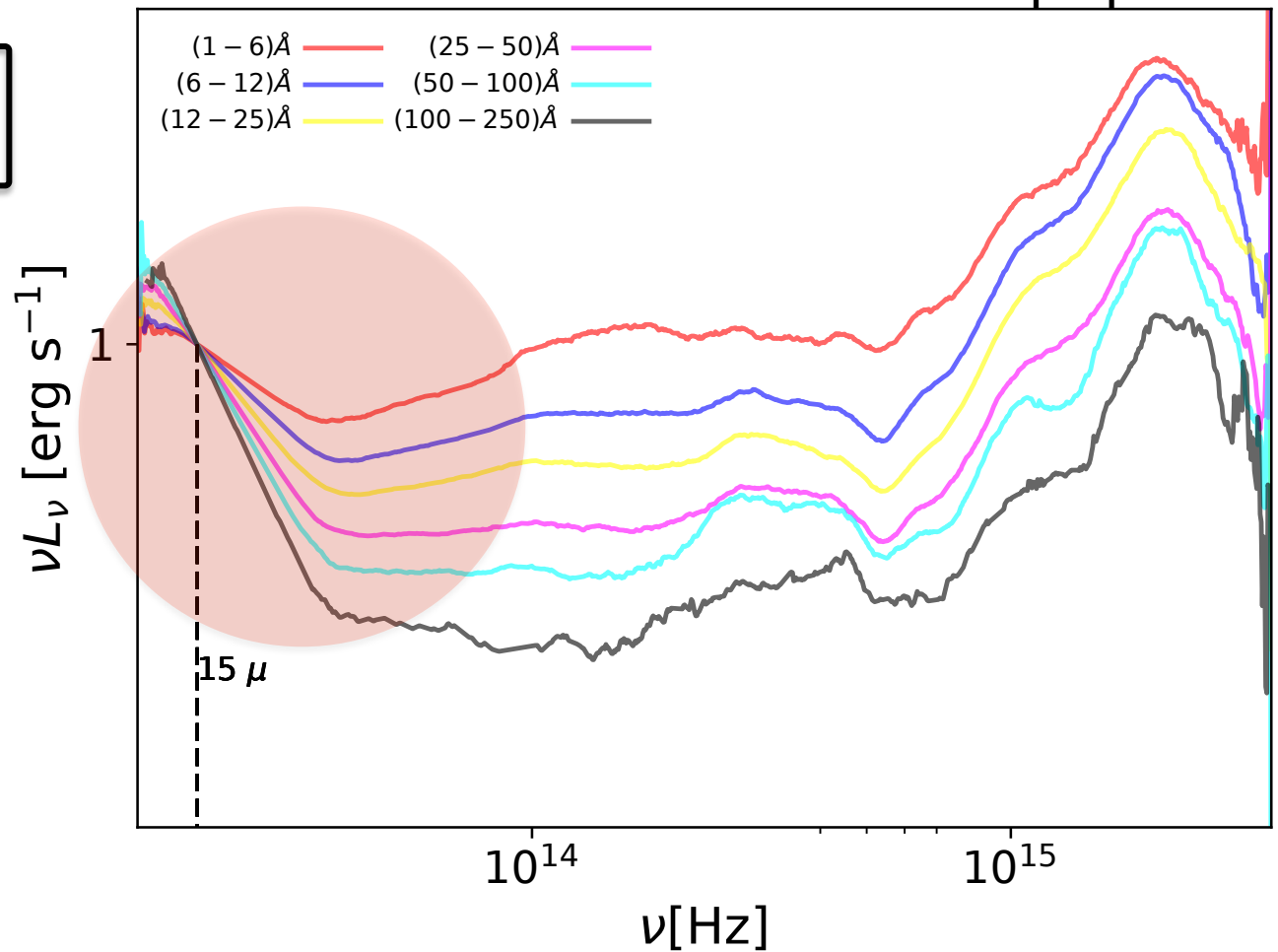
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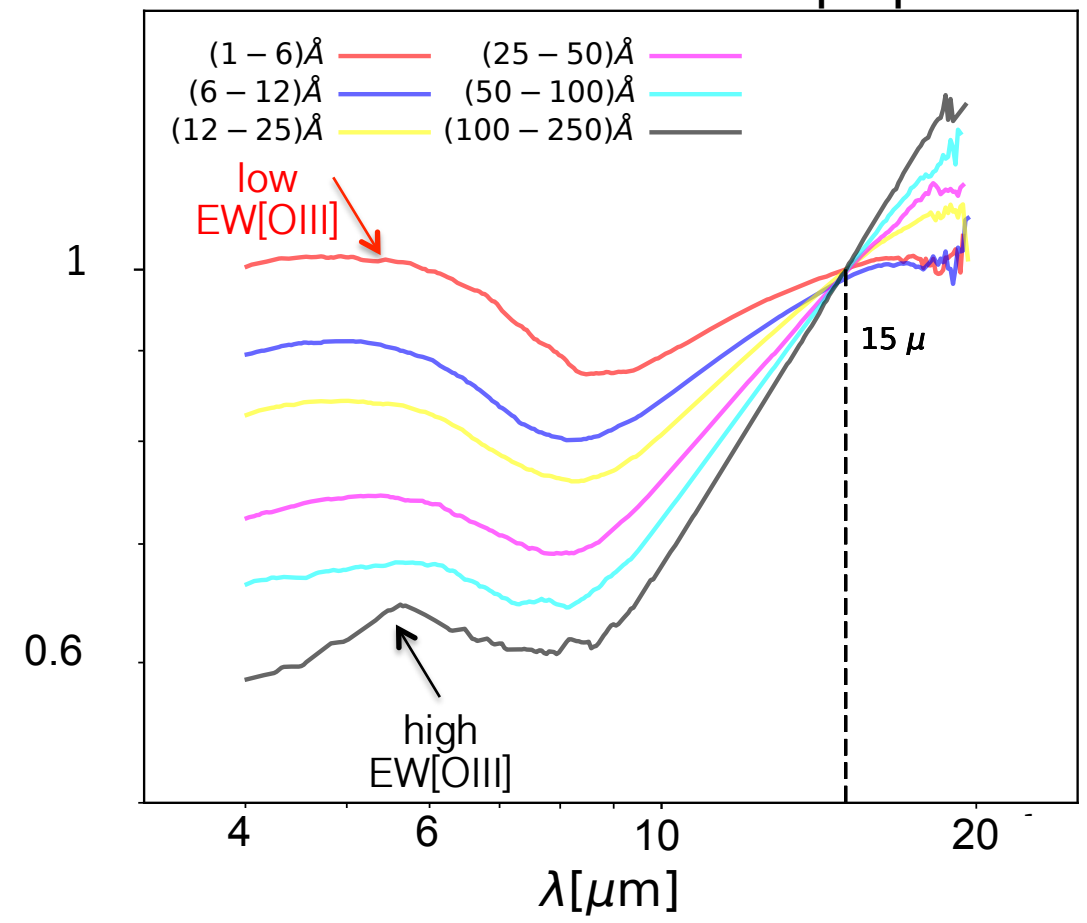
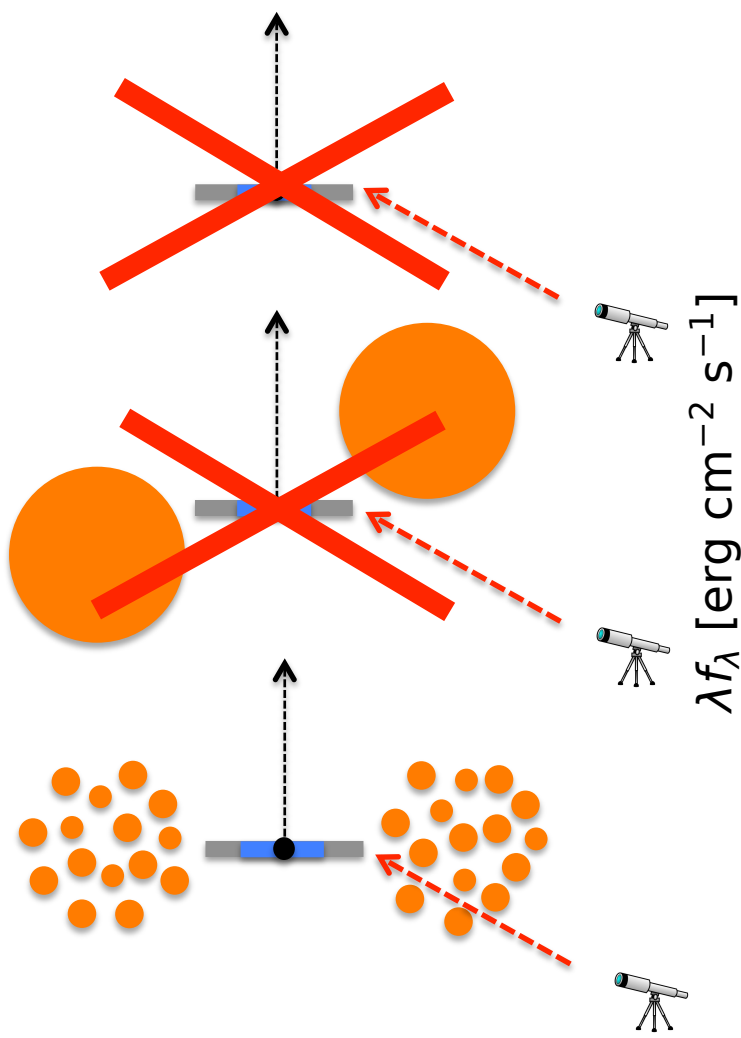
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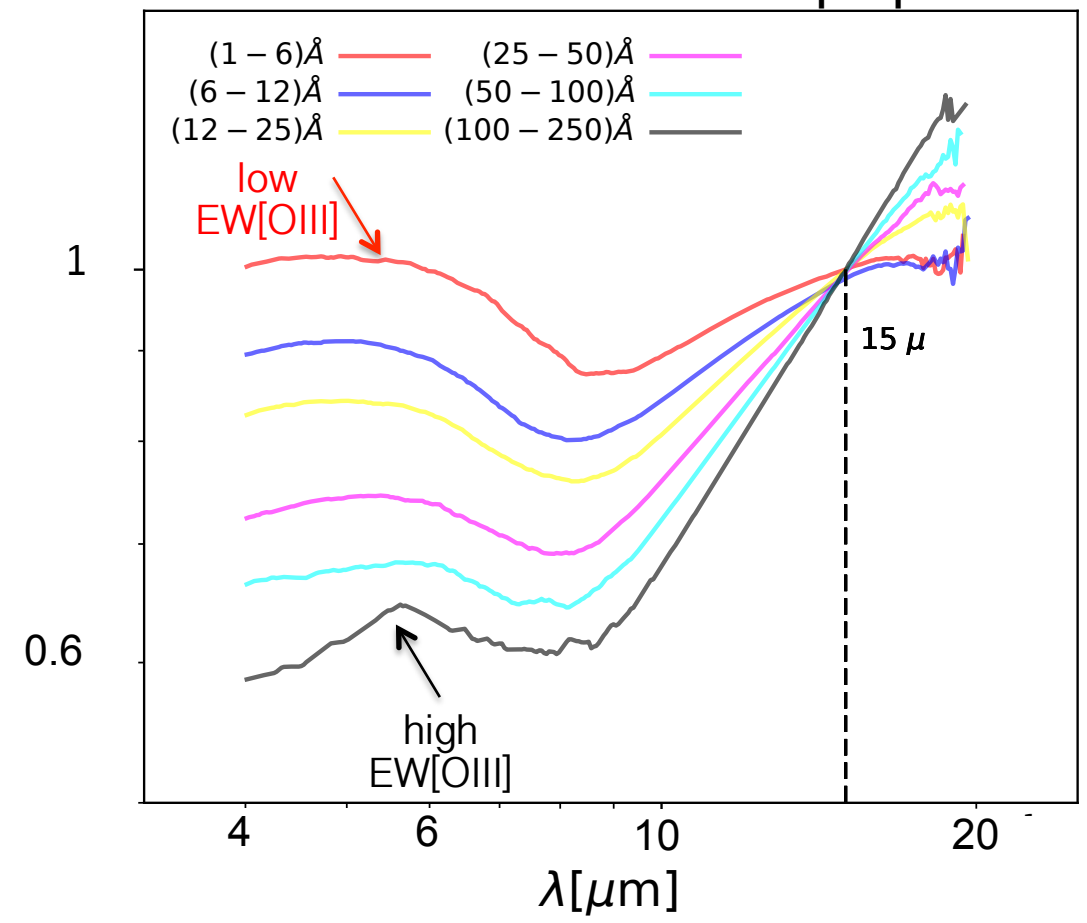
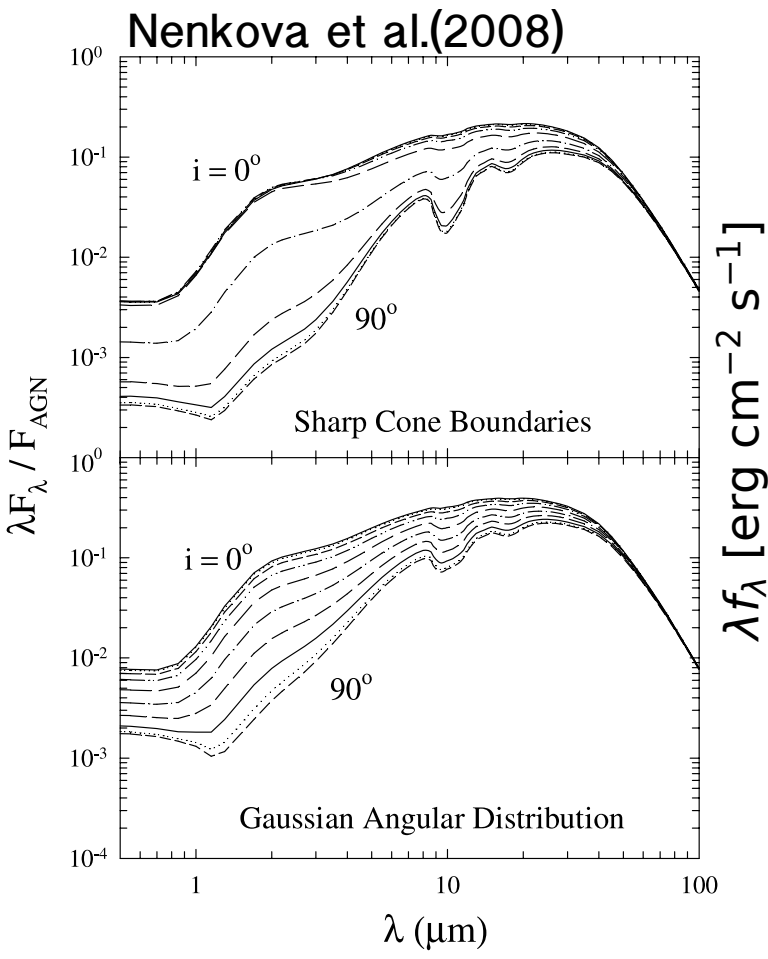
EW[OIII]: results for the torus

Bisogni, Marconi, Lusso, Risaliti 2017b,
in preparation



EW[OIII]: results for the torus

Bisogni, Marconi, Lusso, Risaliti 2017b,
in preparation



EW[OIII]: summary

- Both Broad and Narrow Lines behaviours confirm EW[OIII] is a good orientation indicator:
 - BLR is disk-shaped
 - outflows in the NLR
- Analysis of the IR SED confirms the torus is co-axial with the disk and the BLR and probably clumpy

Perspectives

- Better understanding of geometry and kinematics of the inner components
- Correcting virial mass estimates
- Looking for Changing Look Quasars as a function of EW[OIII]