BACKGROUND IMAGE: composite of many individual GALEX spectra taken at different grism angles

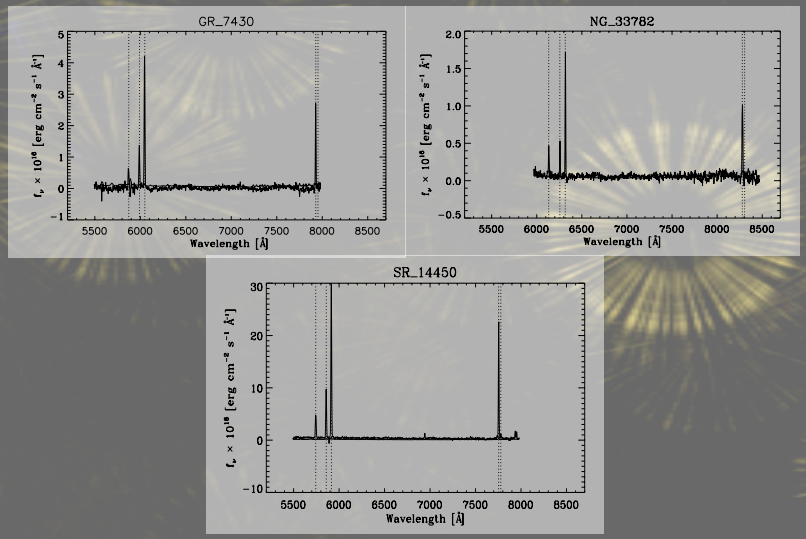
Stellar and Nebular Properties of Lyα Emitters at z=0.3

The role of dust geometry in Lyα escape

Claudia Scarlata

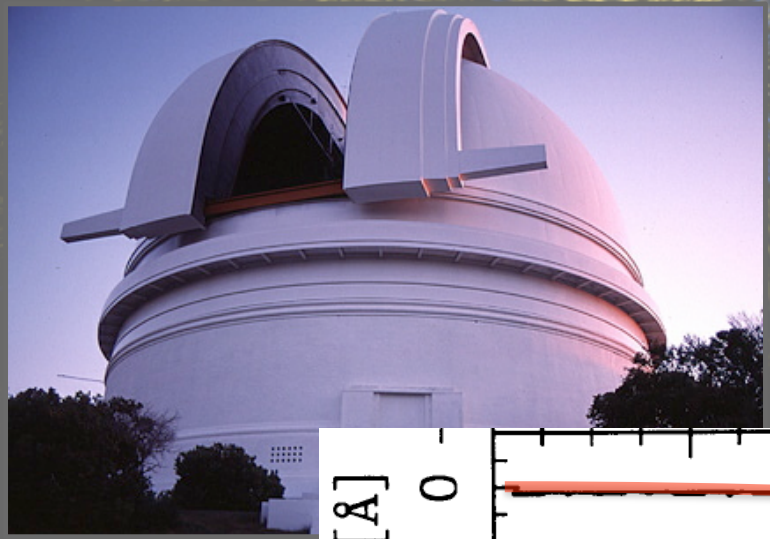
J. Colbert, H. Teplitz, N. Panagia, B. Siana, M. Hαyes, A. Rau, P. Francis, A. Caon, A. Pizzella, C. Bridge

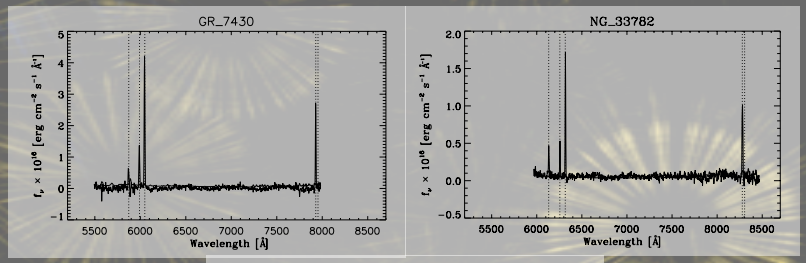
The sample and followup observations

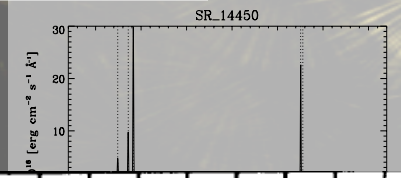


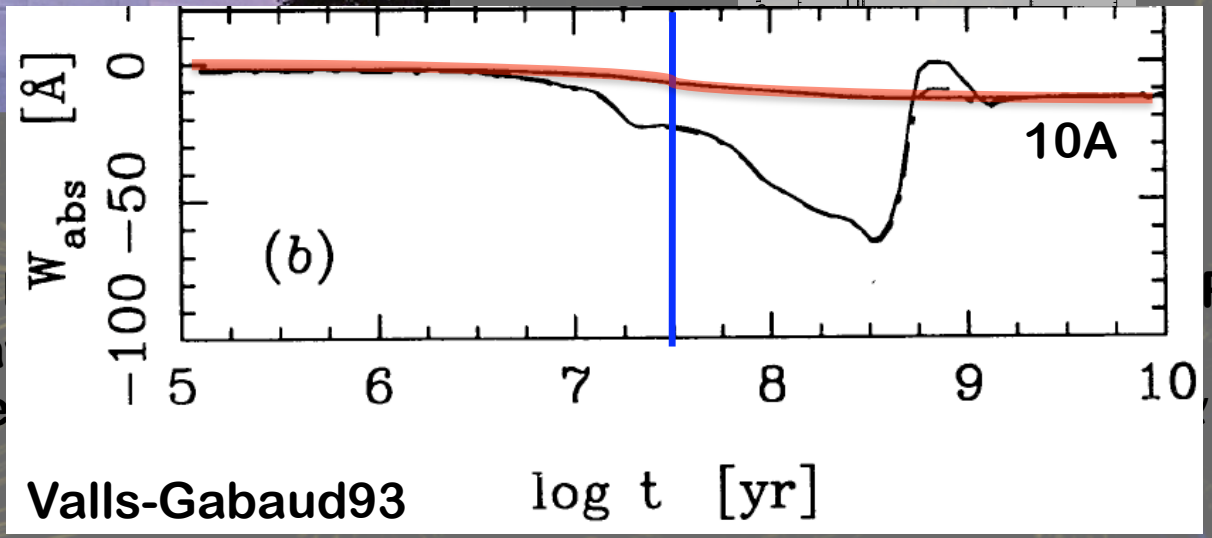
31 Lyα emitters at z=0.3 observed with Palomar DBSP
Wavelength range between 3500 and 8600 A
Stellar absorption correction to Balmer lines and Lyα

The sample and followup observations









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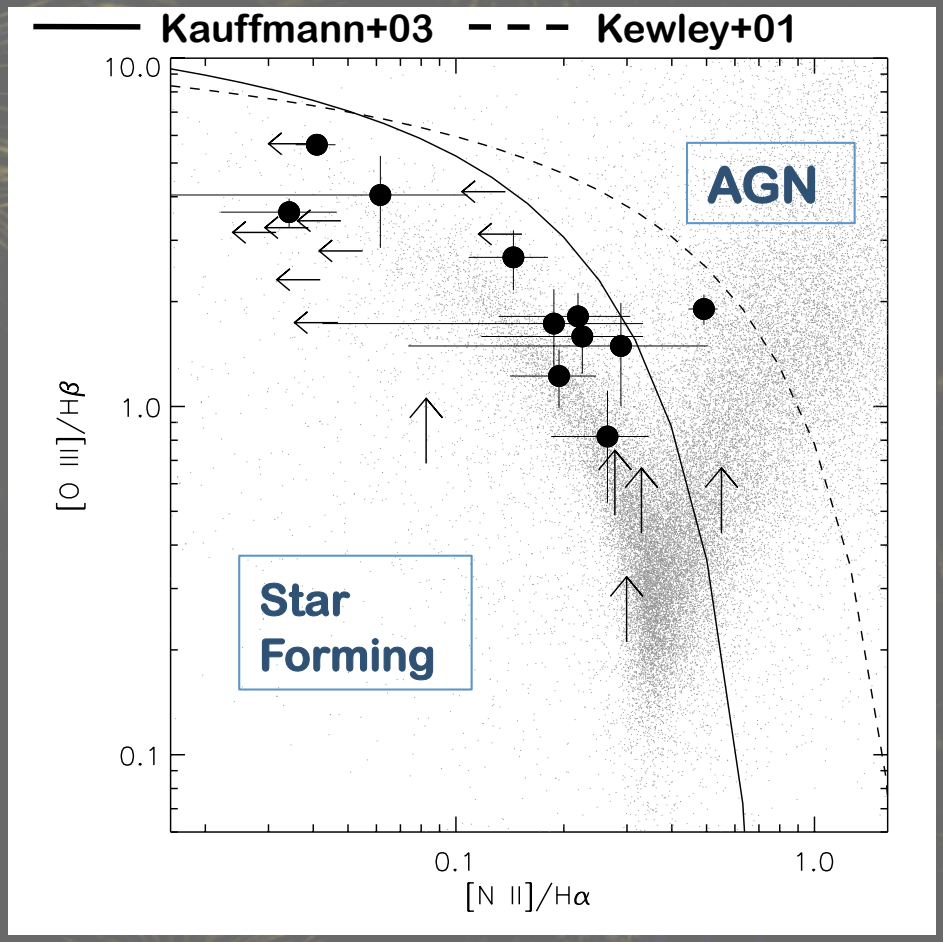
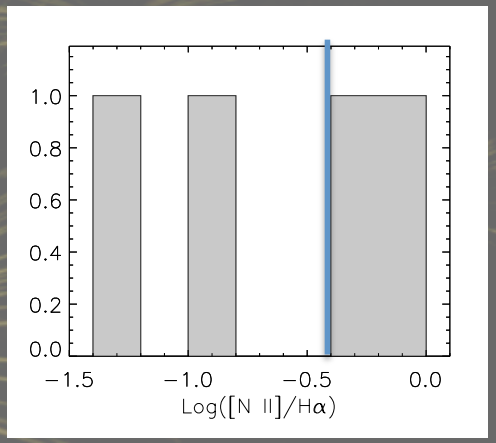
AGN identification

Identification of the narrow line AGN using diagnostic line ratios (line width for one object)

In 17% of the z=0.3 Ly α the gas is likely ionized by an AGN



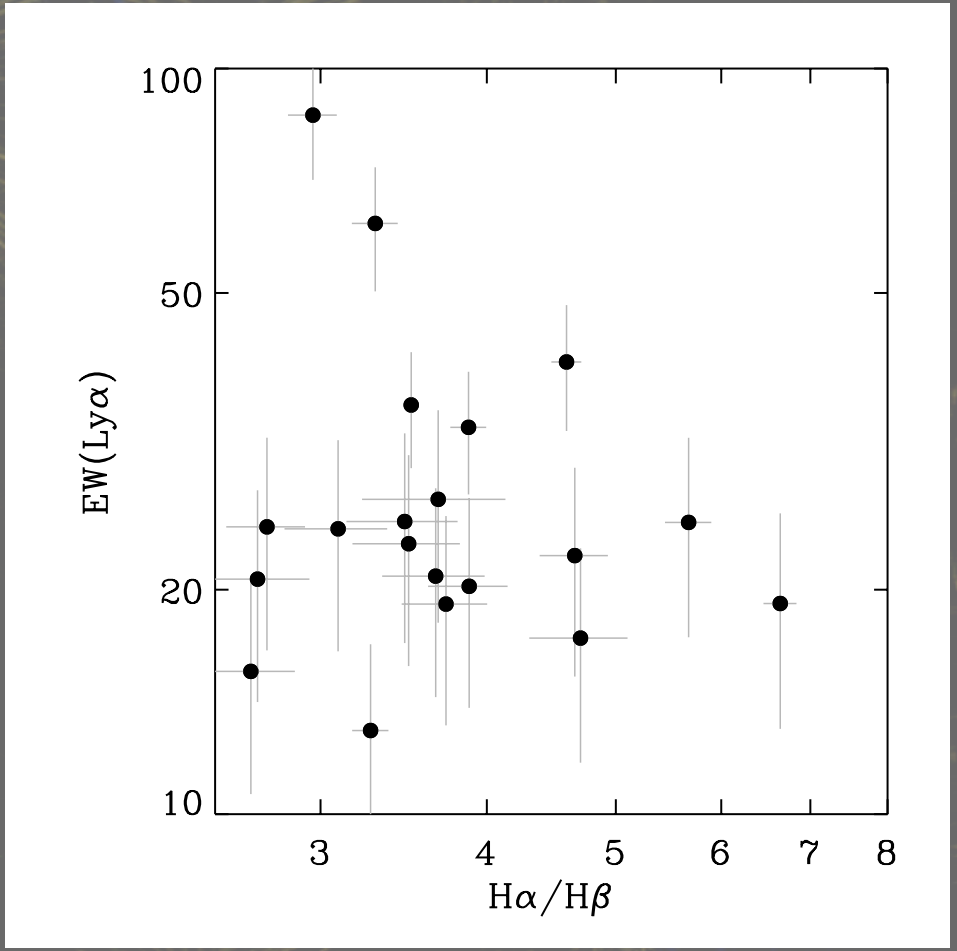


Results: Line Equivalent Width

No correlation between Ly α EW and dust content

BUT: Ly α EW strongly depends on the age of the starburst

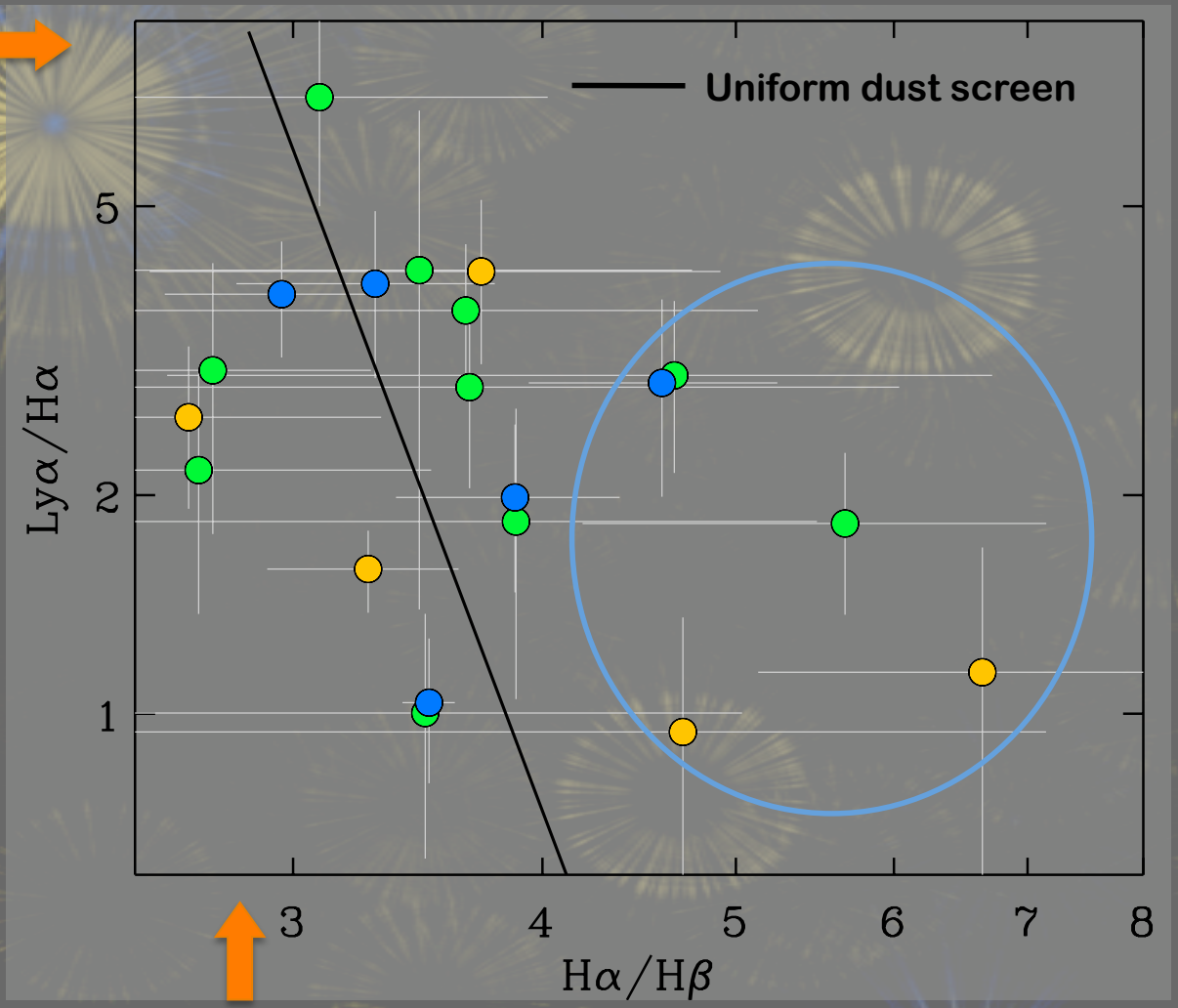
EW is not a good diagnostic for the Ly α attenuation



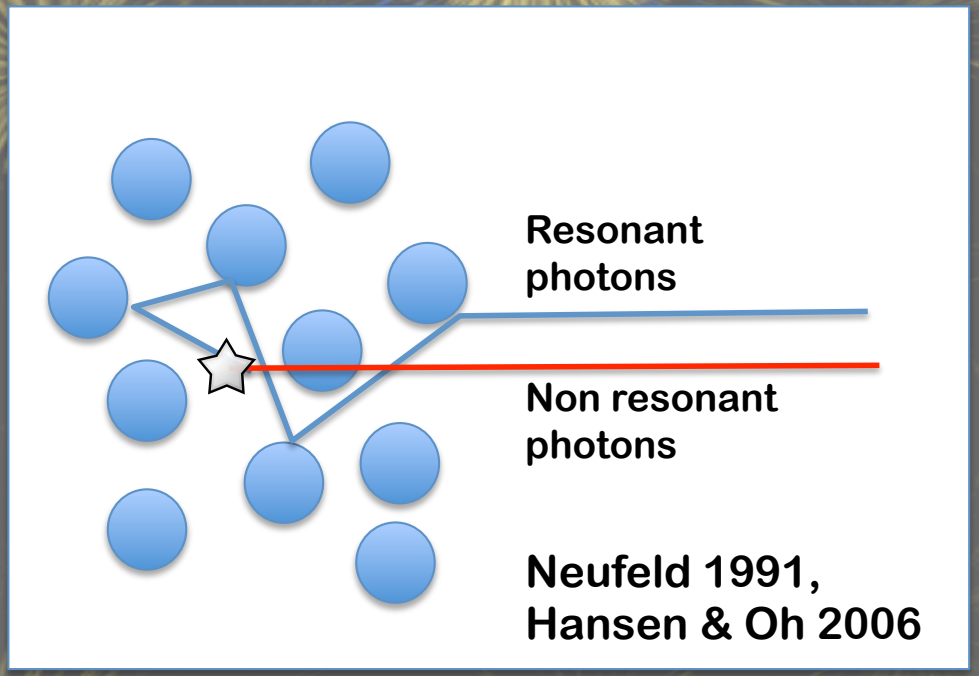
Results: Line Ratios

Ly α/H α not correlated with H α/Hβ as expected from uniform dust screen

No observed extinction curve is able to explain high Ly α/H α ratios



High Ly α/H α: multi-phase models?



Continuum photons go **through** the clumps

Ly α photons travel **in between** the clumps

Ly α/H α enhancement

EW correlated with H α/H β

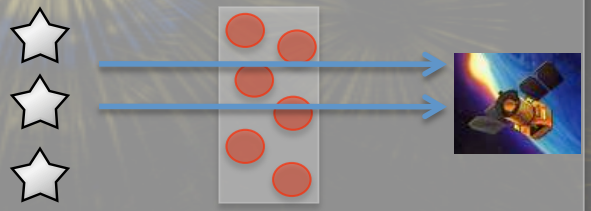
Model the dust geometry

Uniform dust screen

$\log(I/I^0) = -\tau\lambda$

$\tau\lambda \rightarrow$ high values
$I/I^0 \rightarrow 0$

Clumpy dust screen



$\log(I/I^0) = -N(1-e^{-\tau\lambda})$

Natta & Panagia 84
Caplan & Deharveng 86

$\tau\lambda \rightarrow$ high values
$I/I^0 \rightarrow \exp(-N)$

Internal dust

$\log(I/I^0) = \log[(1-e^{-\tau\lambda})/\tau\lambda]$

Mathis 72

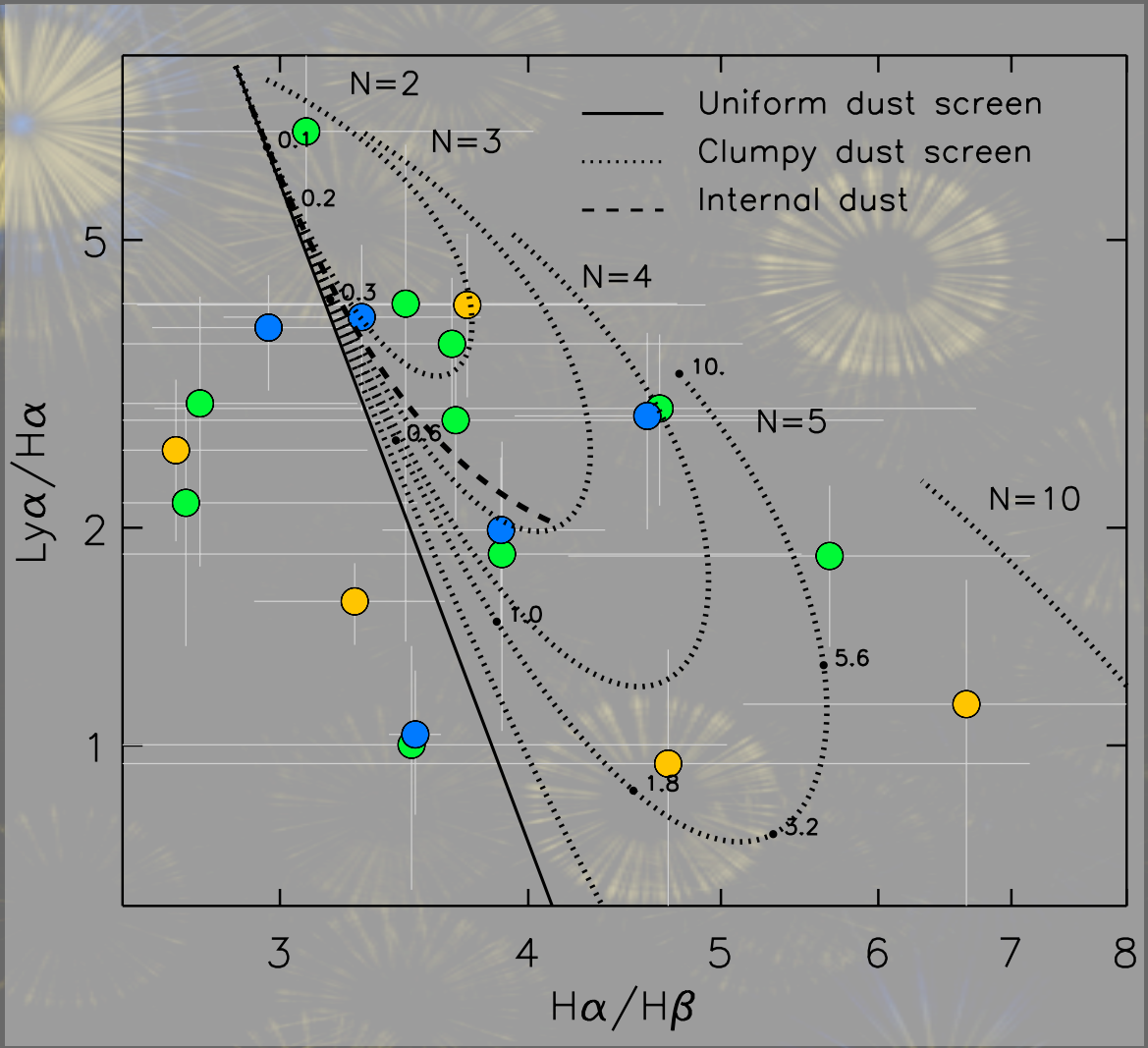
$\tau\lambda \rightarrow$ high values
$I/I^0 \rightarrow 1/\tau\lambda$

Model the dust geometry: Results

Internal dust cannot explain the data

Clumpy dust with various N reproduces the observed points

No need for different paths for Ly α and H α



Clumpy: $\log(I/I^0) = -N(1-e^{-\tau\lambda})$, $I/I^0 \rightarrow \exp(-N)$

Conclusions

- AGN fraction 17%
- Clumpy dust screen is sufficient to reproduce the observed line ratios
- No need for ad hoc models in which the Lyα and the Hα paths are independent
- A combination of clumpy dust + uniform screen cannot be excluded

Additional slides