Exploiting the Chandra Source Catalog 2.0: the first science results

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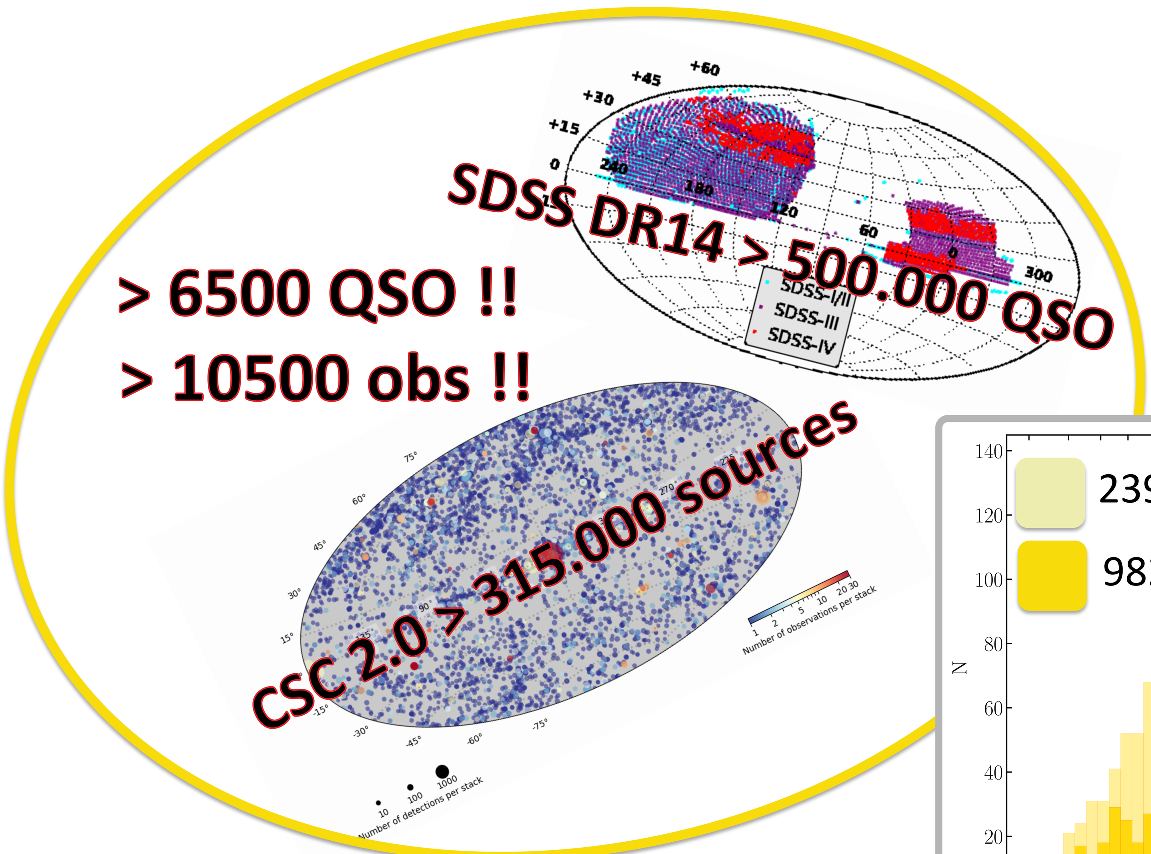
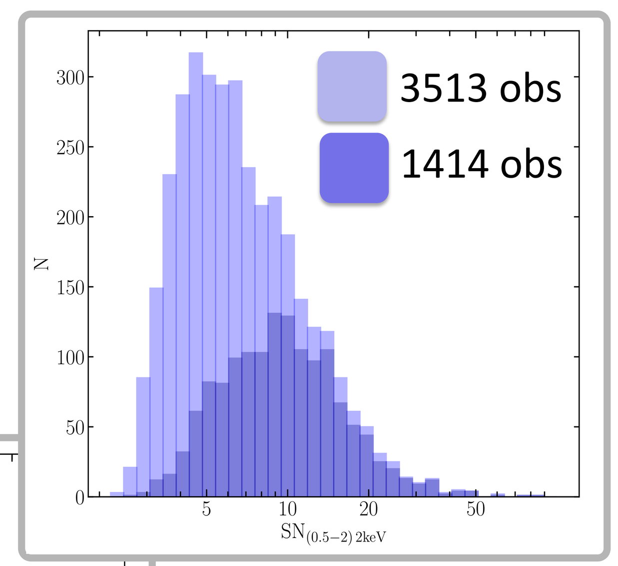
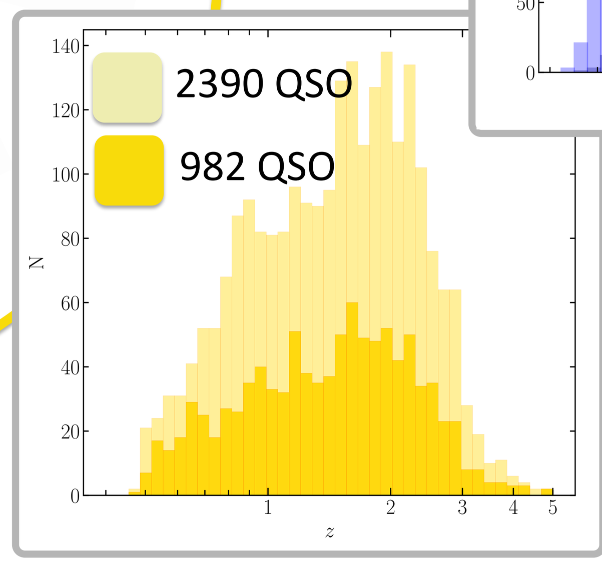
The **Chandra Source Catalog 2.0** (Evans et al. 2010) provides properties for 315,000 X-ray sources detected in the observations taken prior of 2015. We cross-matched the **Sloan Digital Sky Survey DR14** (Paris et al. 2018) and the CSC2.0 to build a sample of >6500 optically selected quasars that have **X-ray spectroscopic information**.

We used it to analyze the relation between the X-ray and Ultraviolet luminosities in quasars and its non-evolution with redshift. Recently, it was found that **the dispersion of this relation is not intrinsic**, but mostly due to observational issues in measuring the two fluxes (at 2kev and 2500Å rest-frame, Lusso & Risaliti 2016, 2017). We filter the sample so to include only sources with these two measures close to the intrinsic values, first in the UV band (no dust reddened, no absorbed objects) and, **after a complete spectroscopic analysis**, in the X-rays.







PARENT SAMPLE (UV selected): Radio QUIET, no BAL, BLUE

FINAL SAMPLE (X-ray selected): $1.7 < \Gamma < 2.8$, no Edd bias

Why are a small dispersion and a non-evolution of the L_X-L_{UV} relation in quasars that important??? Two reasons:

Physics of quasars:

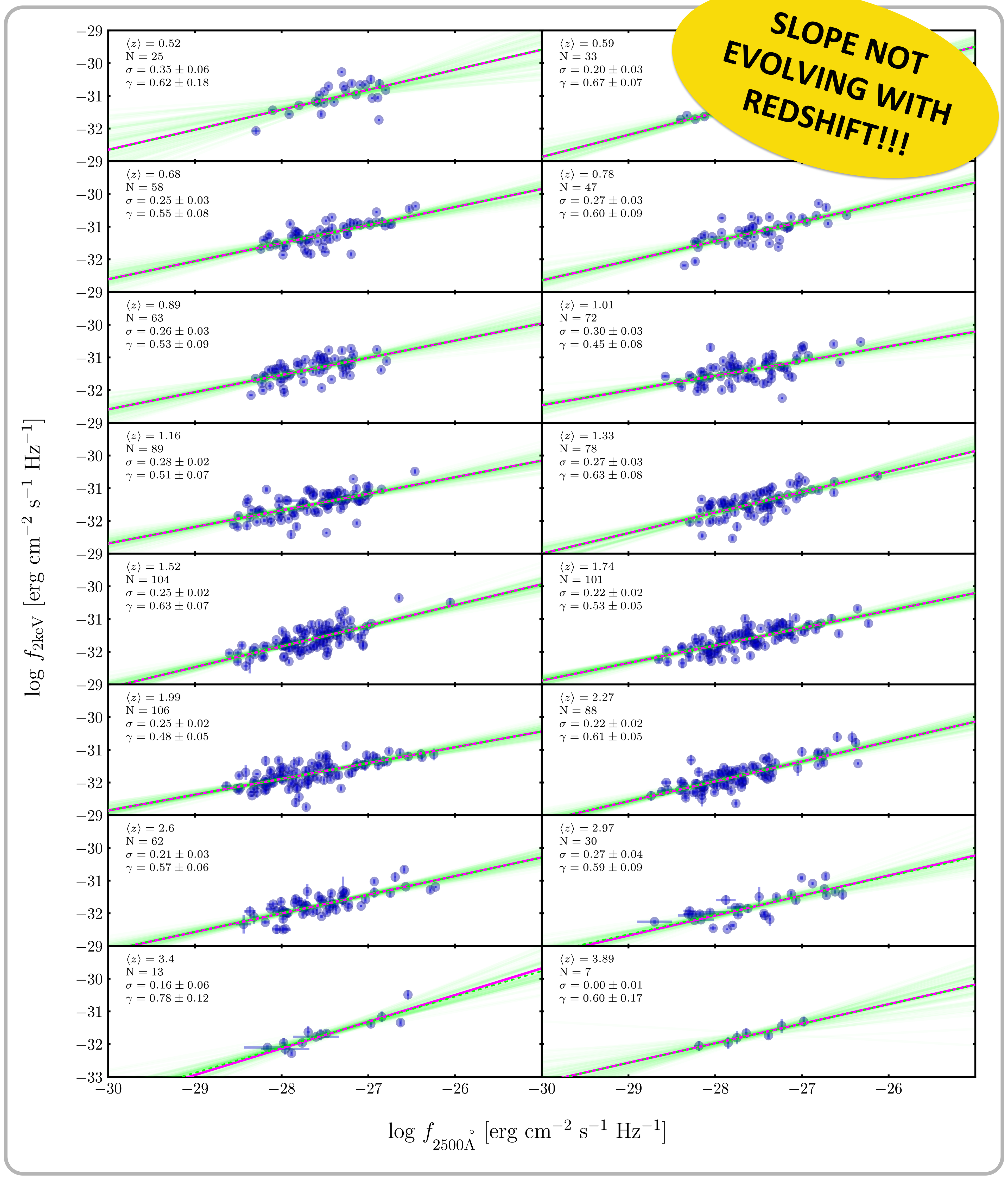
It implies that **the interplay between accretion disc and hot corona is very tight and universal**, spanning several decades in both luminosities and a long cosmic time!! The physical mechanism behind it is still unclear!!

Cosmology:

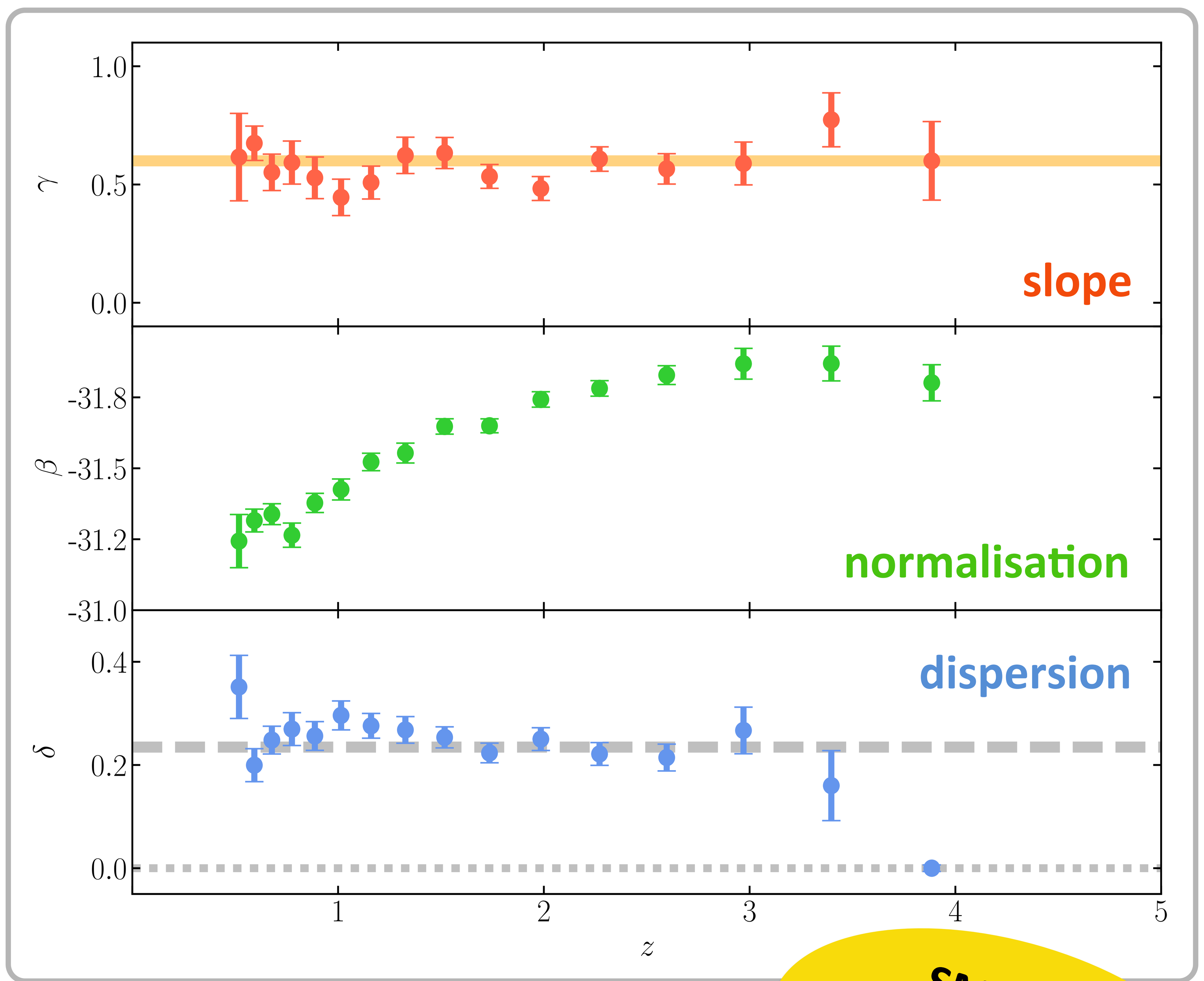
The non-linear relation provides a measure of cosmological distances. For that to be true, the relation can not evolve with redshift. Also, the smaller the dispersion the higher the precision we can achieve in measuring cosmological parameters! **Quasars can be used as standard candles at redshifts never probed before**!

The results published so far with archival samples made use of photometric data, reaching a dispersion of 0.24 dex on the relation (e.g. Risaliti & Lusso 2019).

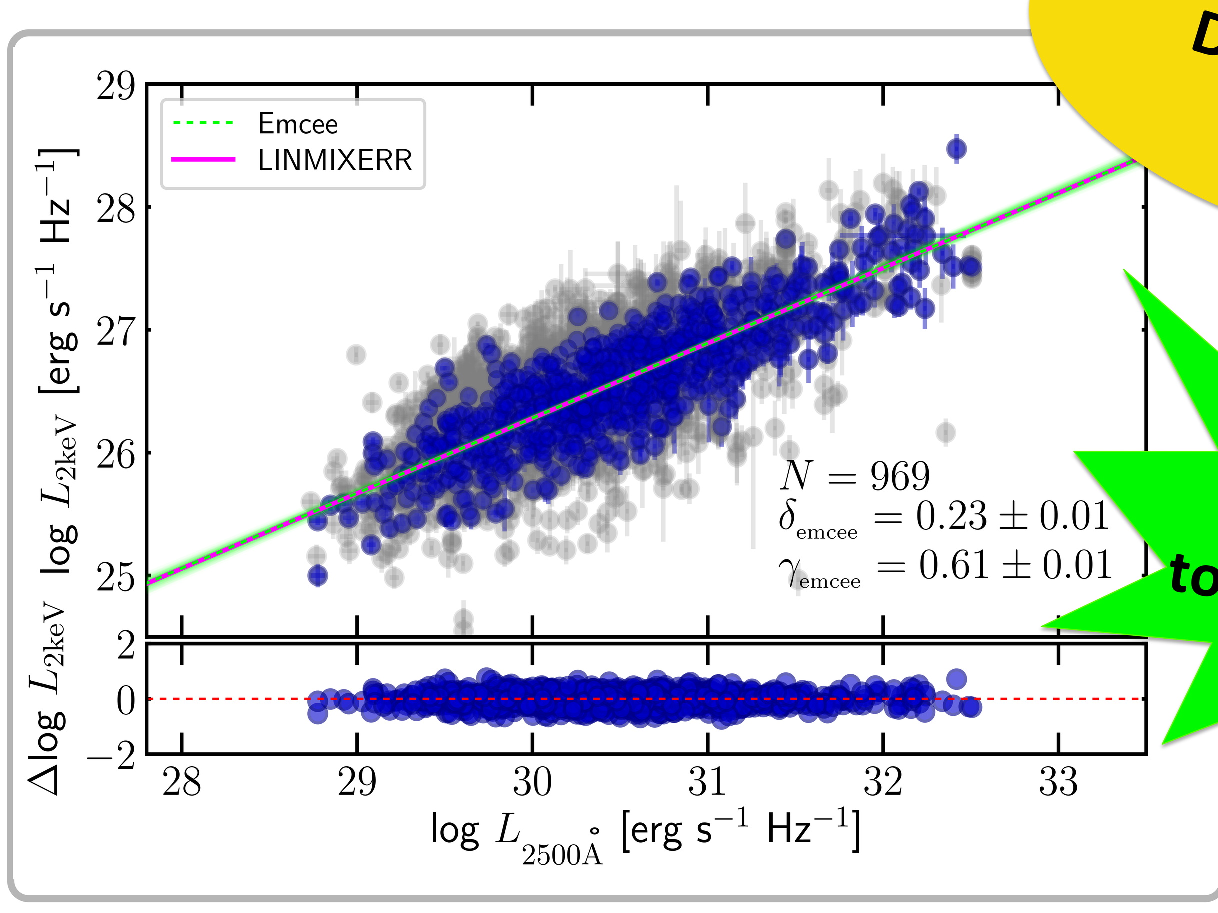
Here we present a huge step forward by using spectral data provided by the newly released CSC 2.0, that allowed us to test extensively the non-dependence of the relation from redshift and to obtain an unprecedentedly small dispersion.



SLOPE NOT EVOLVING WITH REDSHIFT!!!



SMALLEST DISPERSION EVER!!!



Bisogni et al. to be submitted!

REFERENCES: Evans et al. 2010, ApJS, 189, 37E; Lusso & Risaliti 2016, ApJ, 819, 154L; --. 2017, A&A, 602A, 79L; Risaliti & Lusso 2019, NatAs, 3, 272R.