

ETH

Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

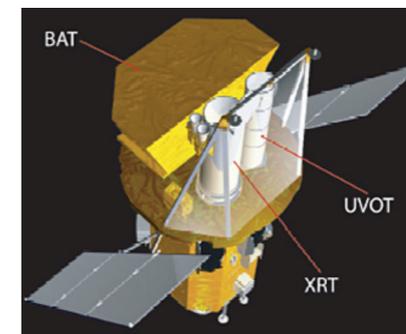
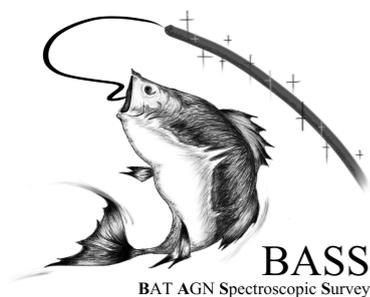
The nature of the most luminous obscured AGN in the low-redshift universe

Rudolf Bär

ETH Zurich

BASS meeting Gainesville, February 2019

with Benny Trakhtenbrot^{2;3}, Kyuseok Oh⁴, Michael J. Koss⁵, O. Ivy Wong⁶, Claudio Ricci^{7;8;9}, Kevin Schawinski¹, Anna K. Weigel¹, Lia F. Sartori¹, Kohei Ichikawa^{10;11}, Nathan J. Secrest¹², Daniel Stern¹³, Fabio Pacucci¹⁴, Richard Mushotzky¹⁵, Meredith C. Powell¹⁴, Federica Ricci^{16;17}, Krista L. Smith¹⁸, Isabella Lamperti¹⁹, and C. Megan Urry¹⁴

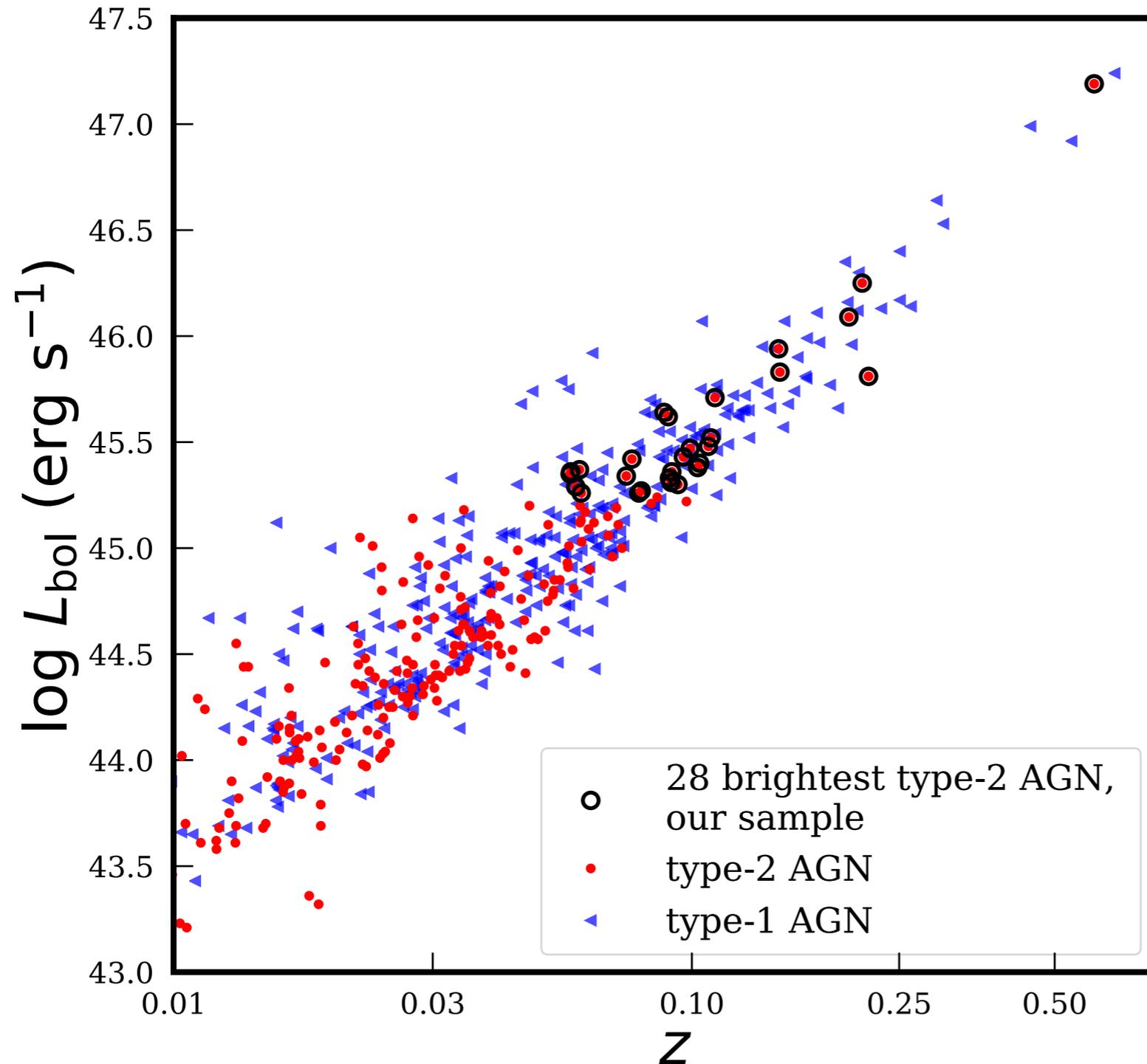


Burst Alert Telescope (BAT)

Analysis of the 28 most luminous obscured Type 2 AGN of BASS/DR1

**Are they just very luminous or do they have
common characteristics as a group?**

Sample selection



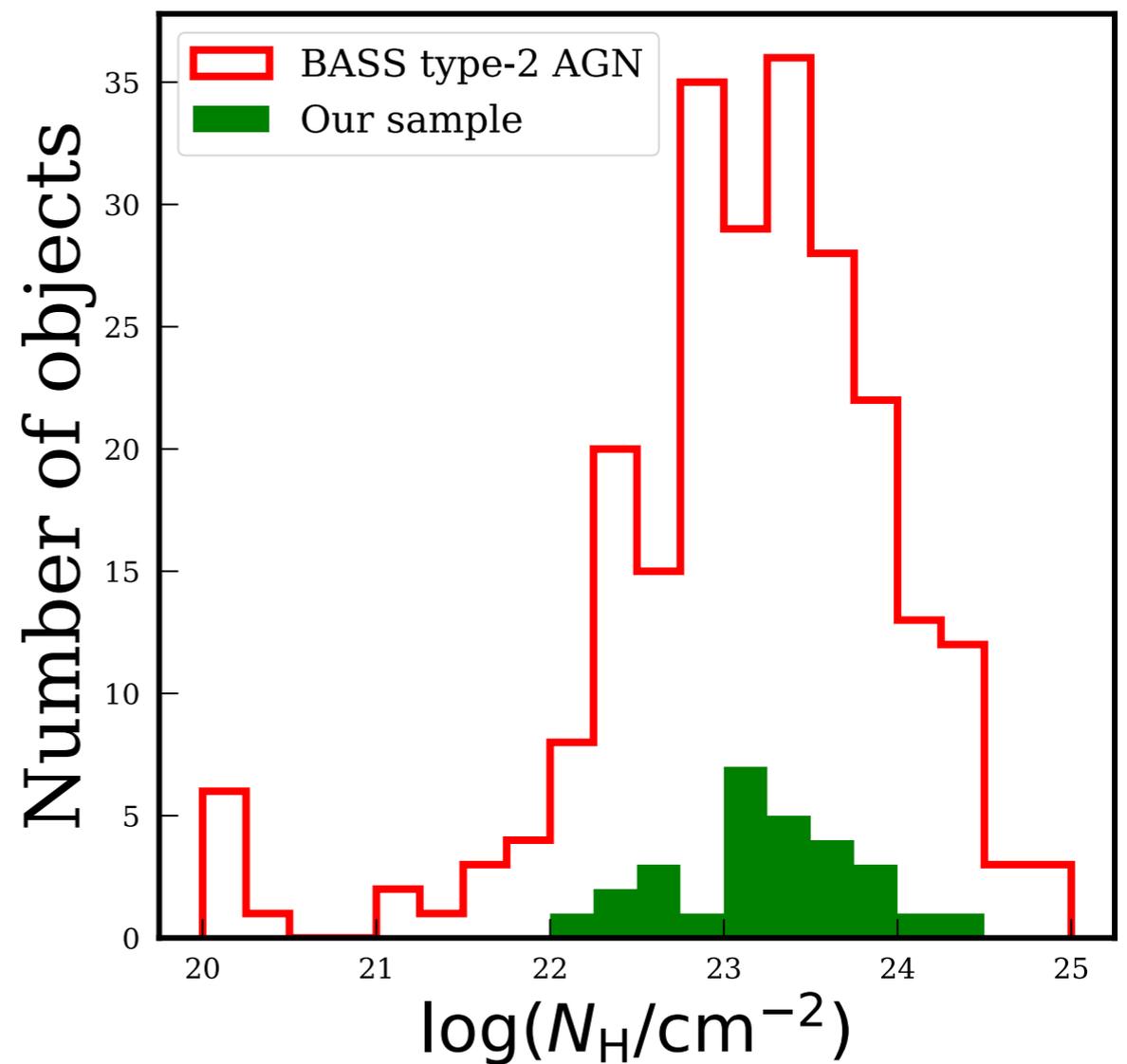
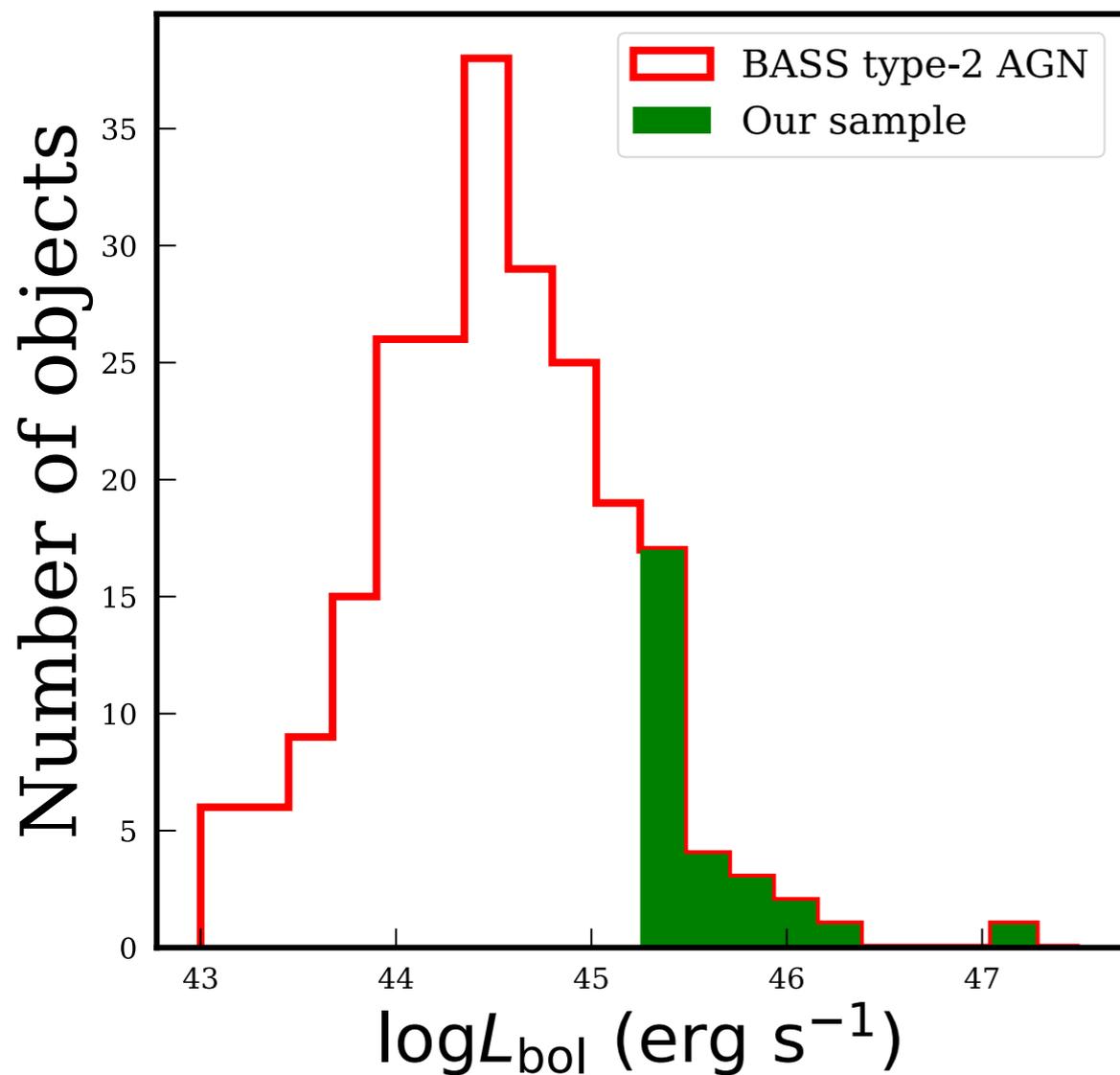
no broad lines

No Blazars

$|6^\circ| >$ galactic plane

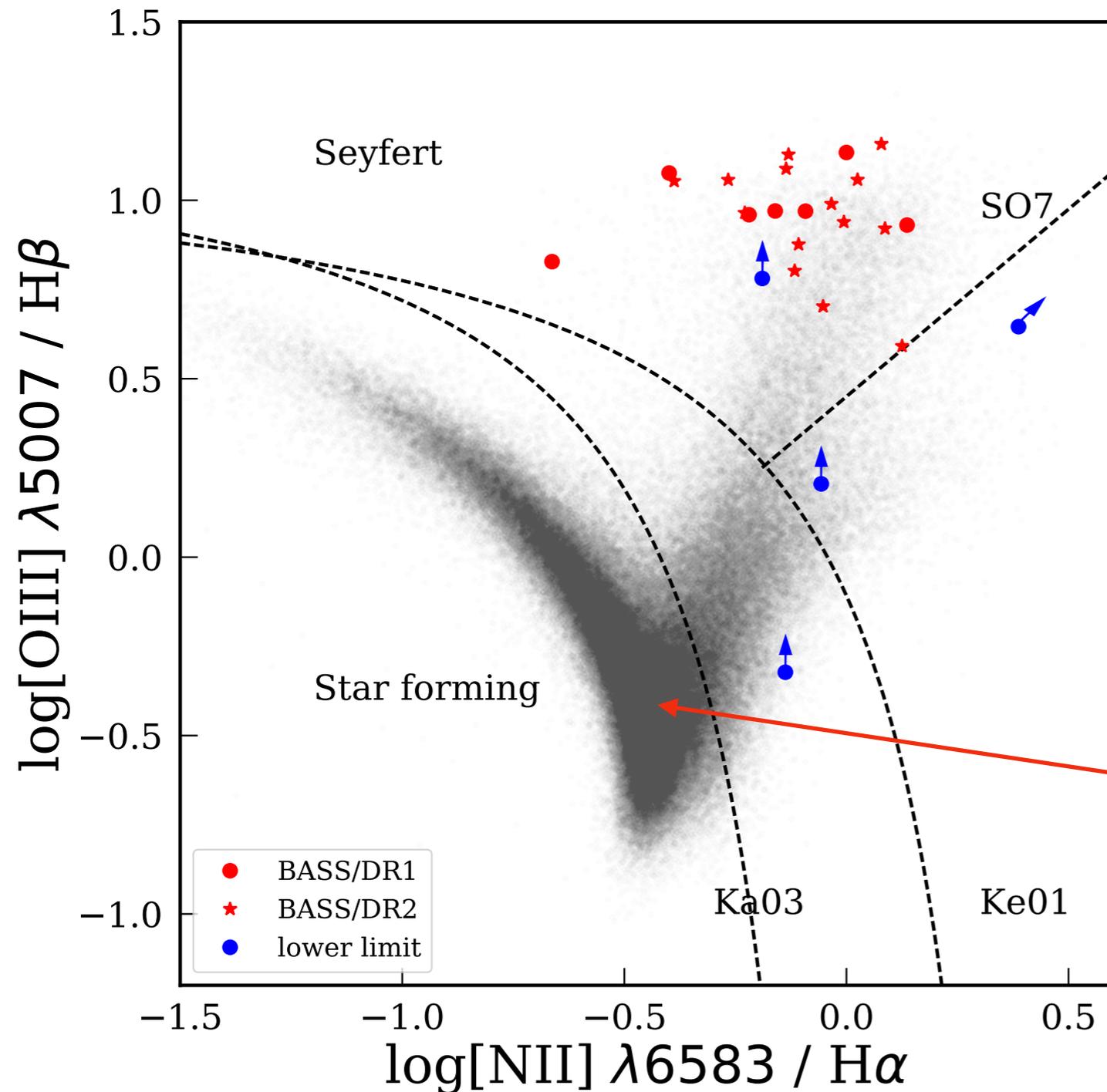
Black hole masses
initially only 10 of 28

Comparison $\log L_{\text{bol}}$ & $\log N_{\text{H}}$



—>compton thick

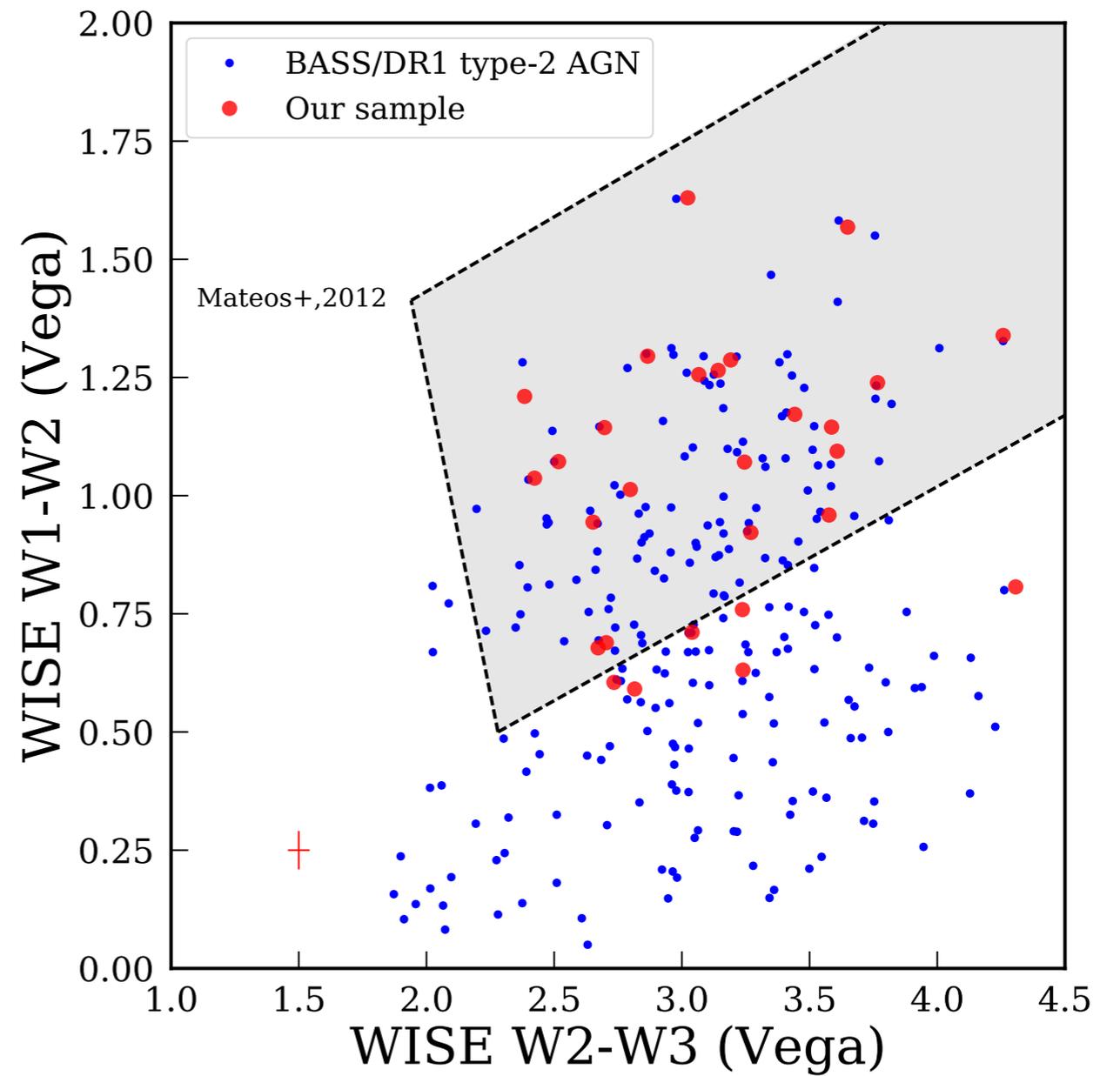
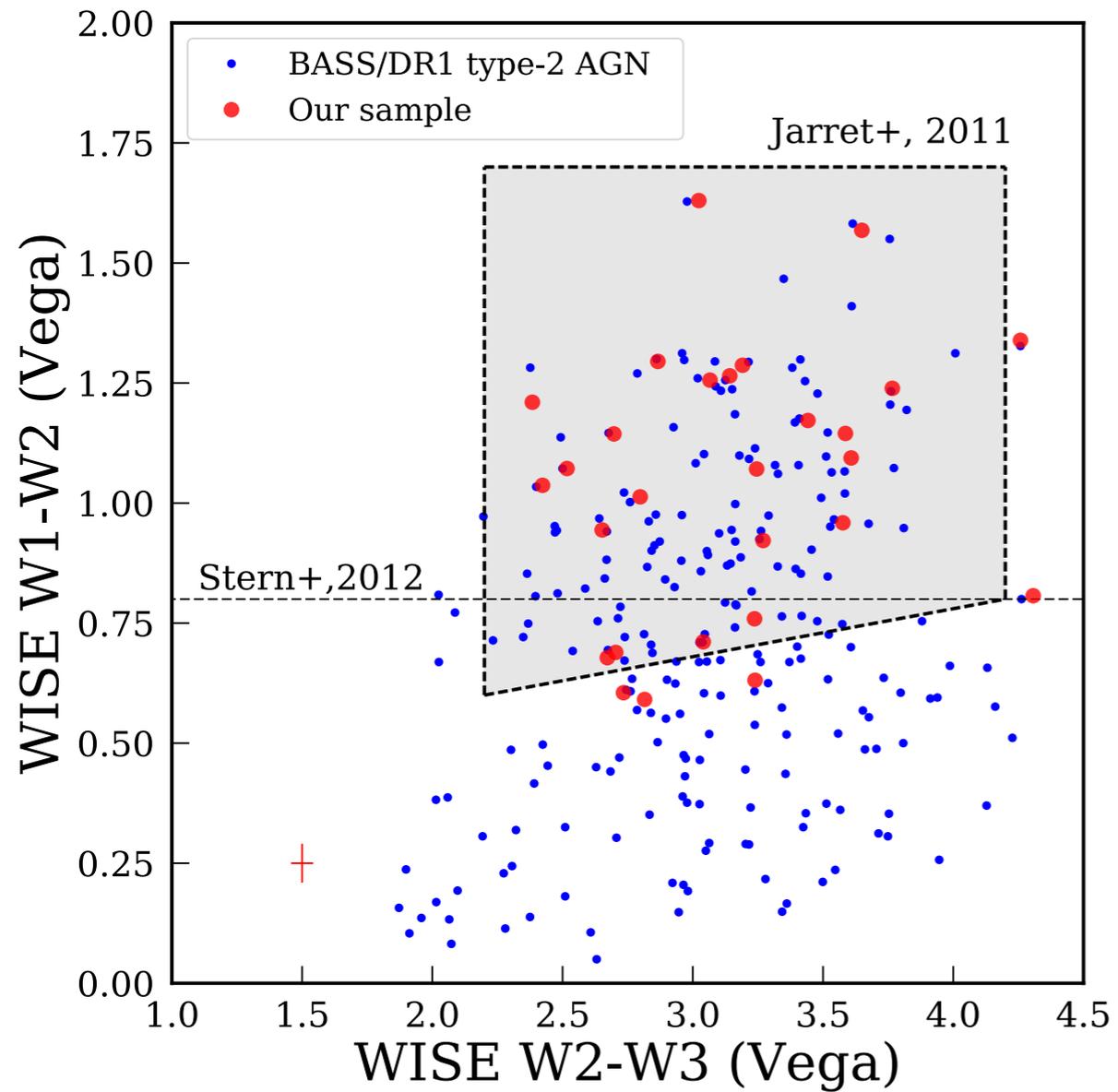
BPT Diagram



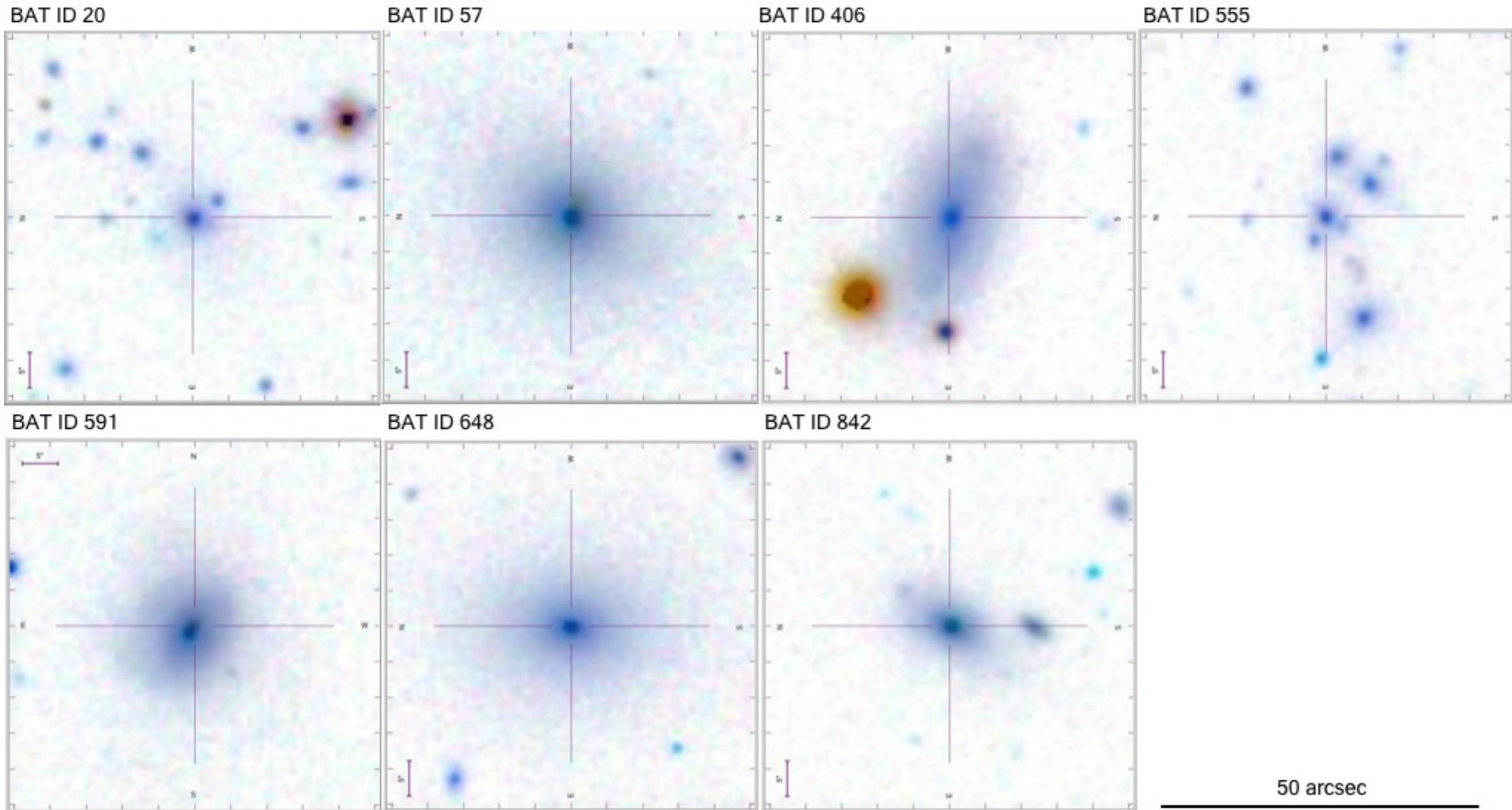
Clear classification
as AGN \rightarrow 21 of 28
4 with upper limits
but consistent with AGN

Total SDSS population
 $0 < z < 0.1$

WISE Analysis

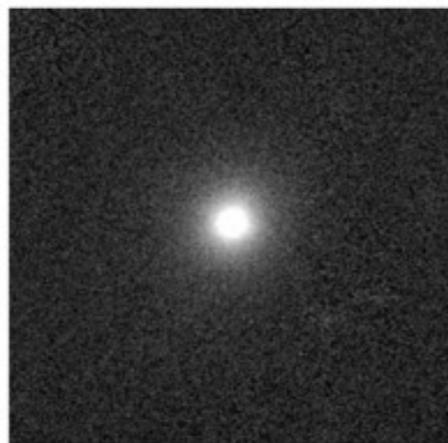


IMAGES: SDDS

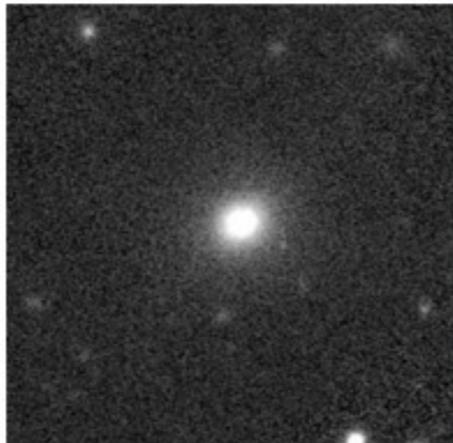


IMAGES: PanSTARRS

BAT ID 57



BAT ID 118



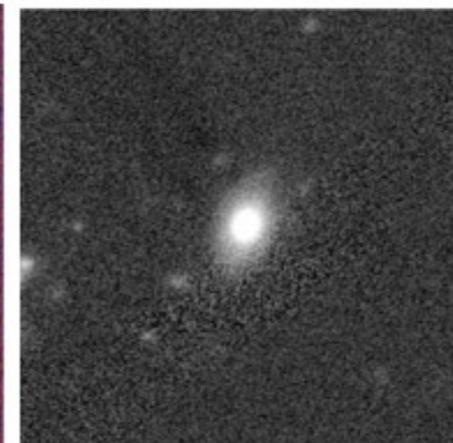
BAT ID 149



BAT ID 179



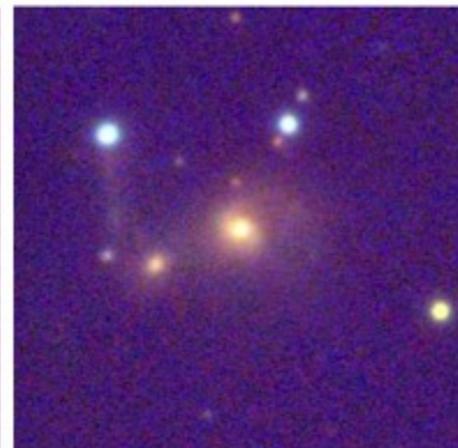
BAT ID 203



BAT ID 238



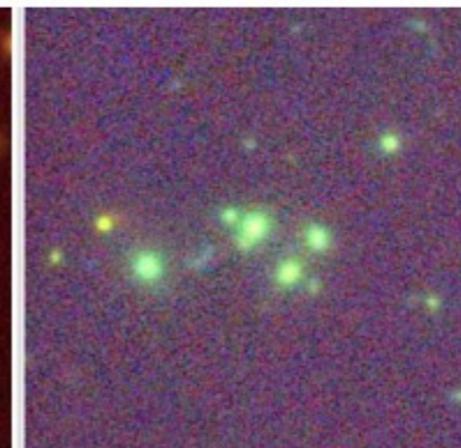
BAT ID 249



BAT ID 303



BAT ID 555



BAT ID 591



BAT ID 648



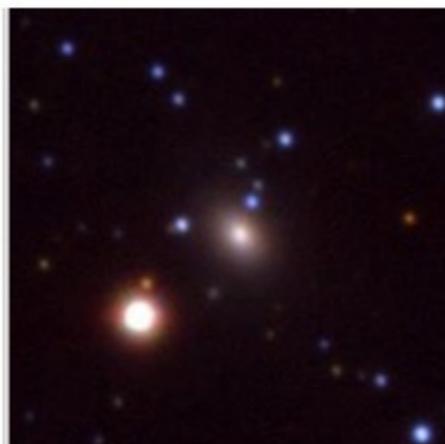
BAT ID 842



BAT ID 968



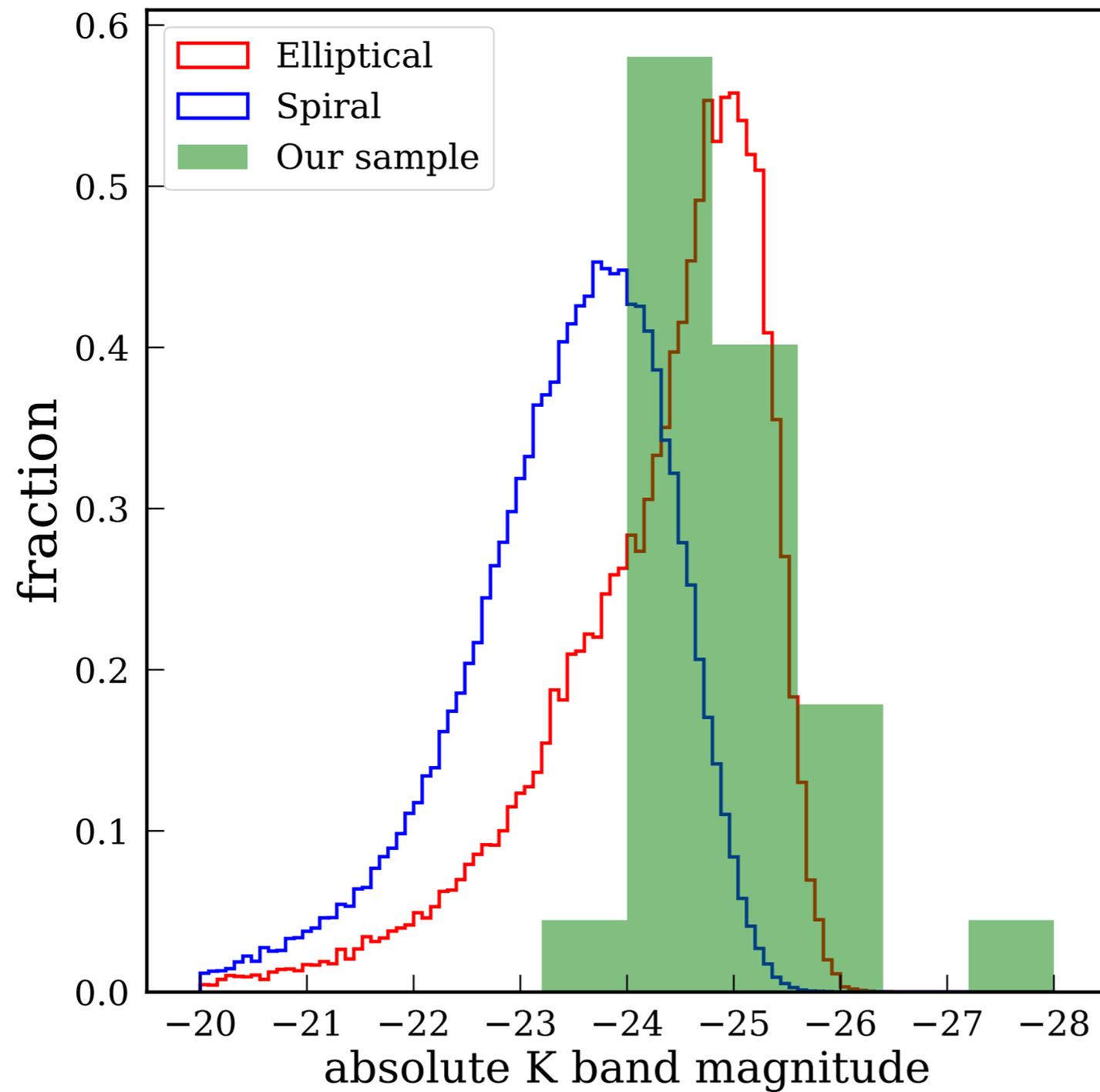
BAT ID 1051



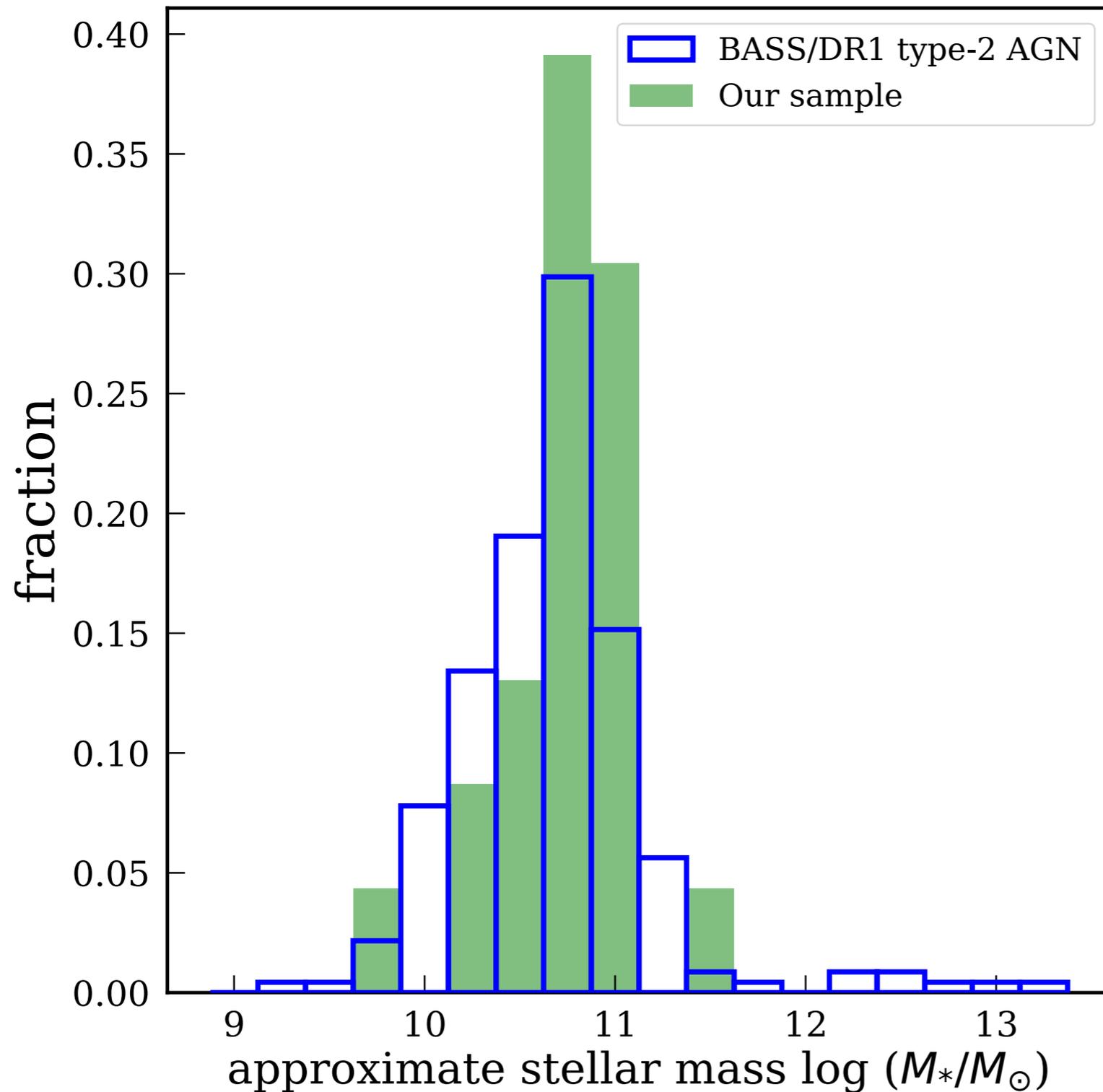
1 arcmin



Absolute K band Magnitudes & Morphologies

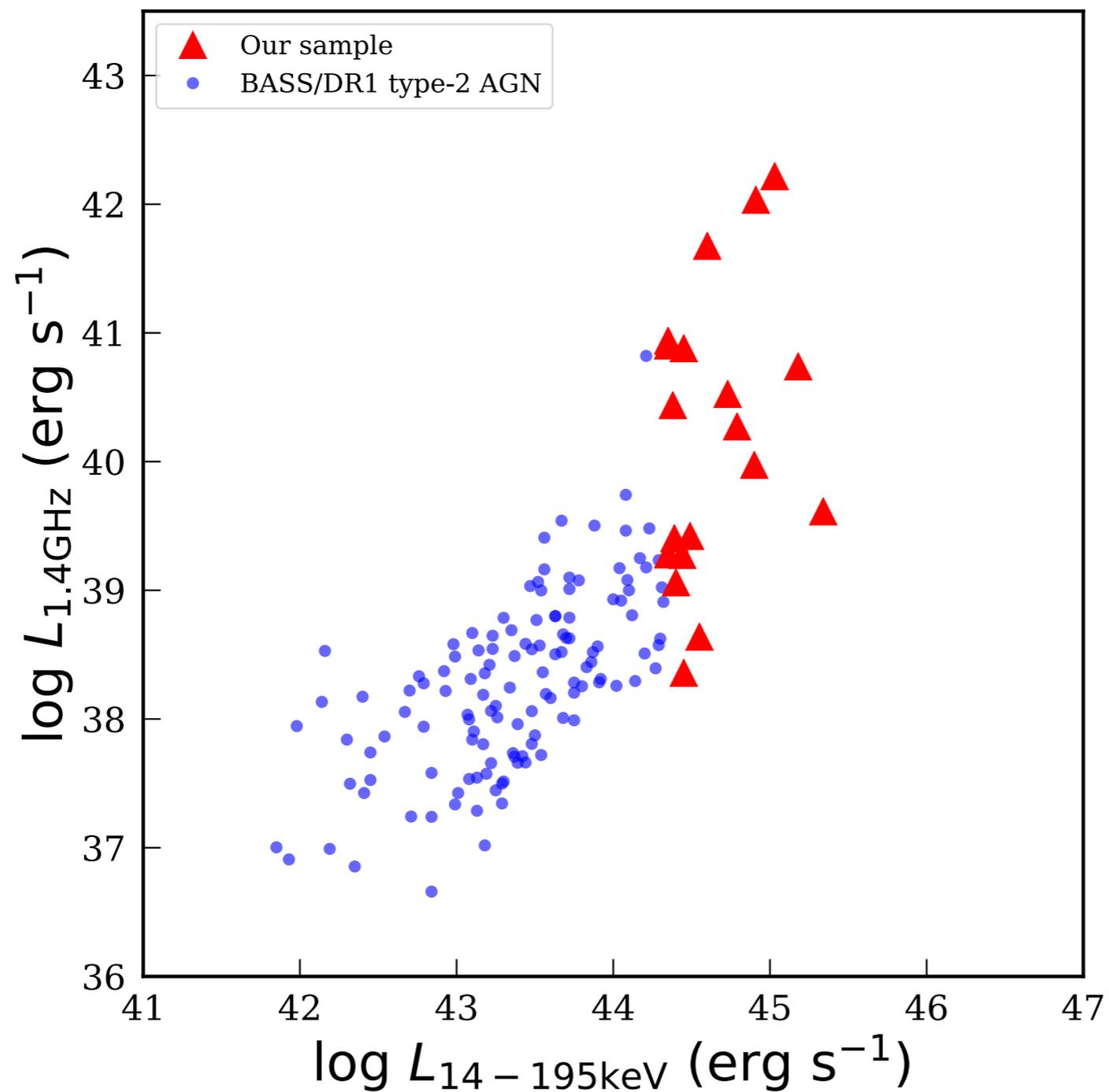


Stellar Mass

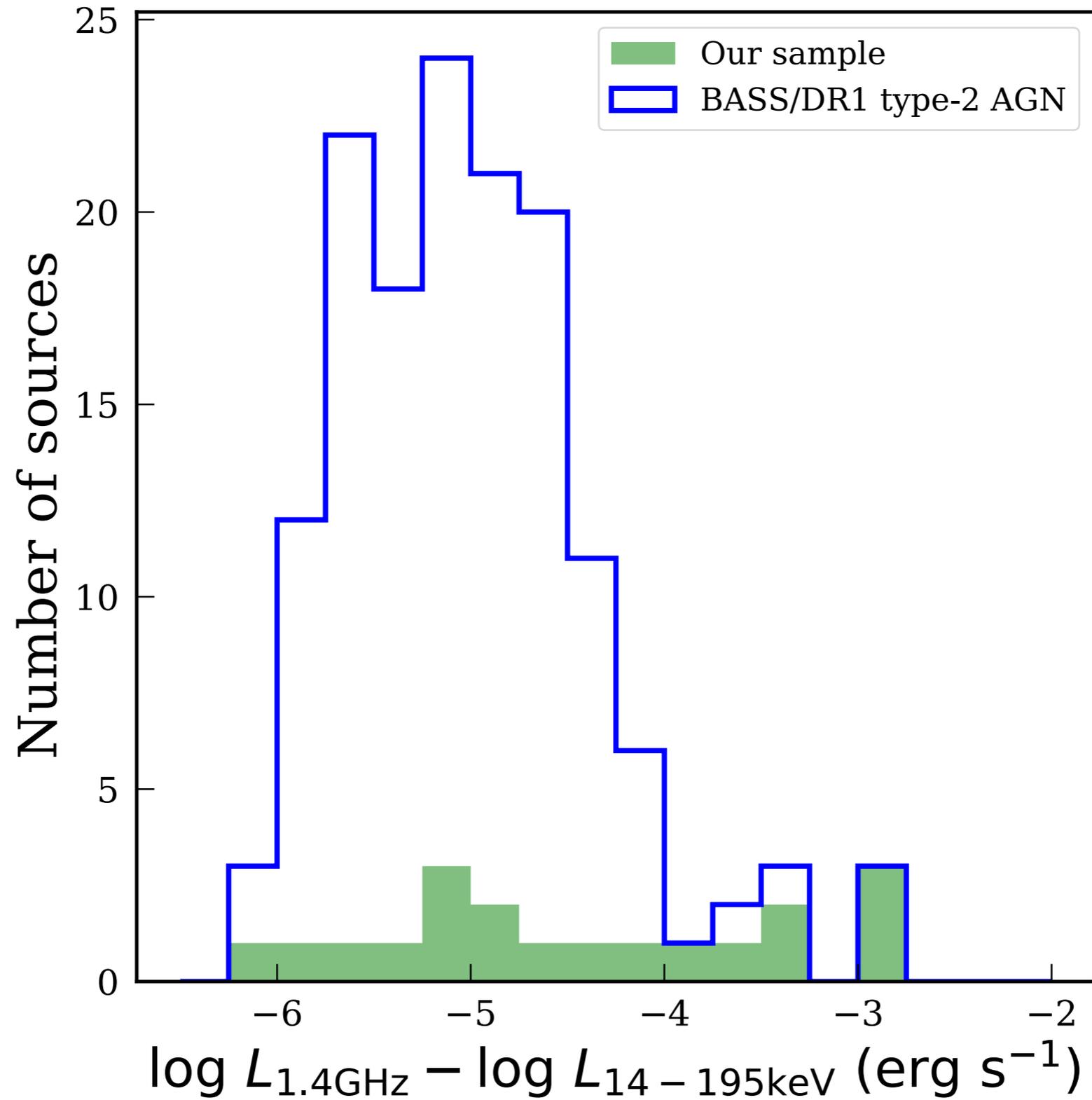


Stellar masses extend over a wide range but are skewed toward the high mass region

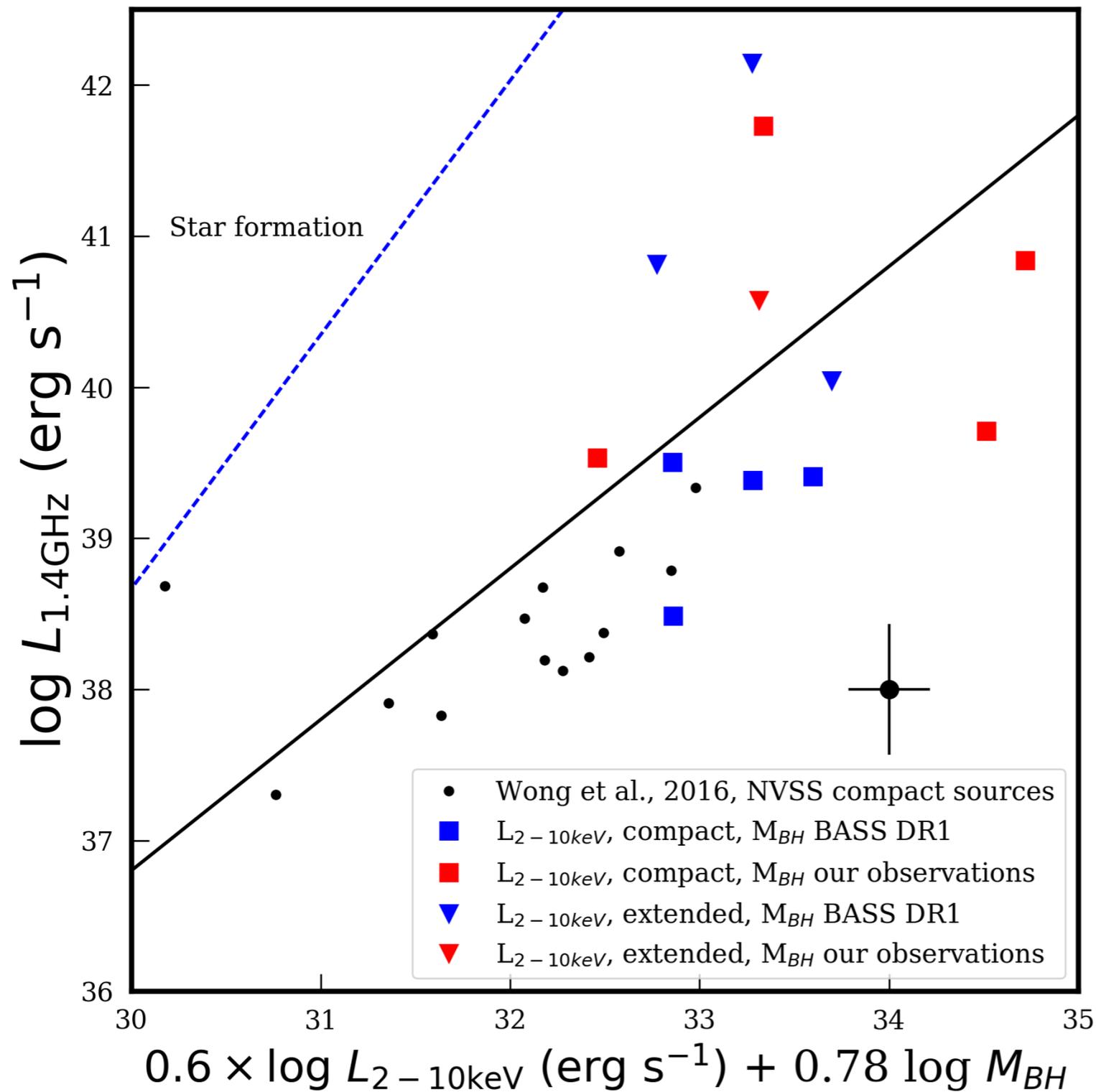
Luminosity: Radio vs Hard X-RAY



Relative Luminosity: Radio-Hard X-Ray

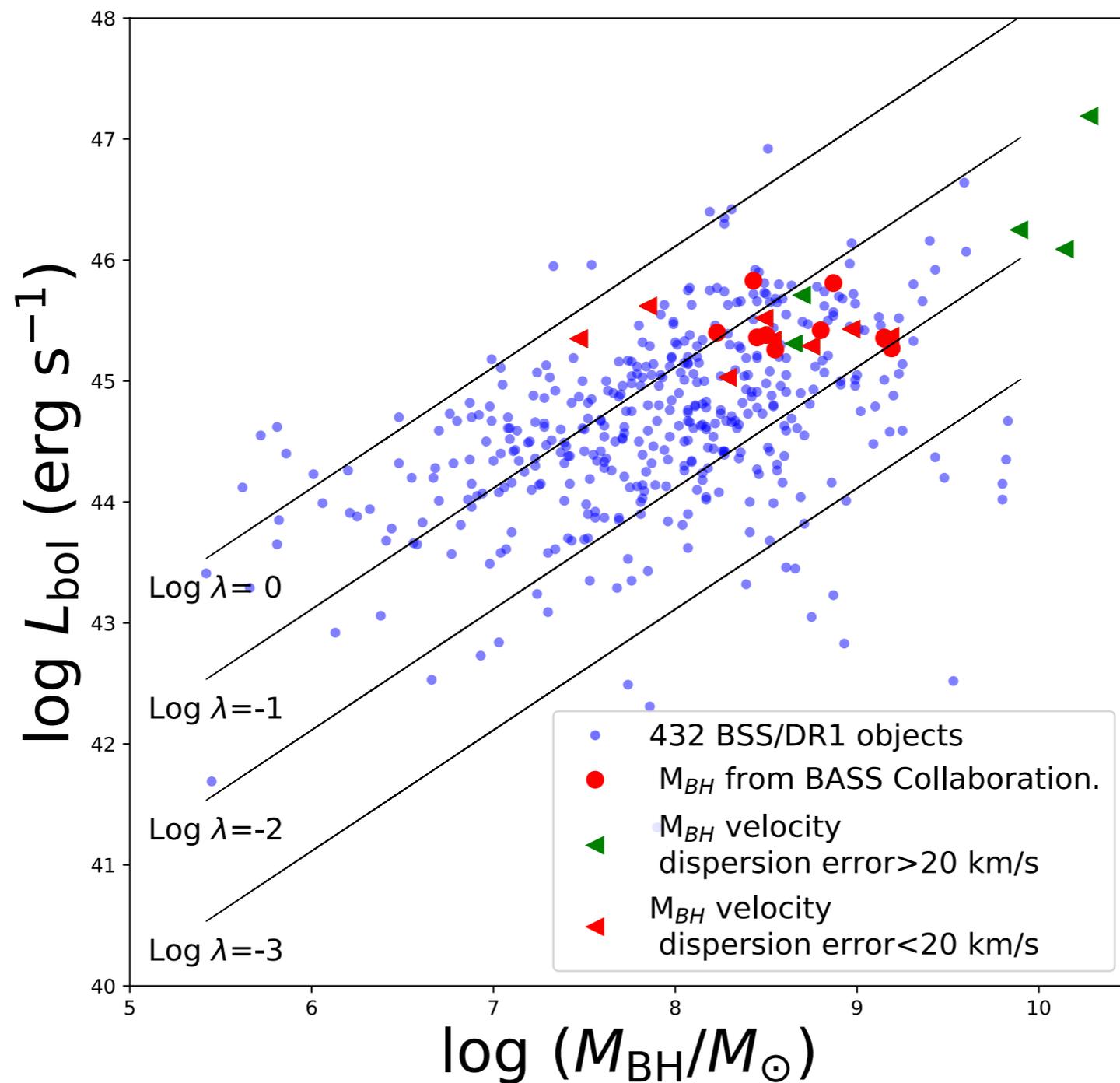


Fundamental Plane radio / X-ray

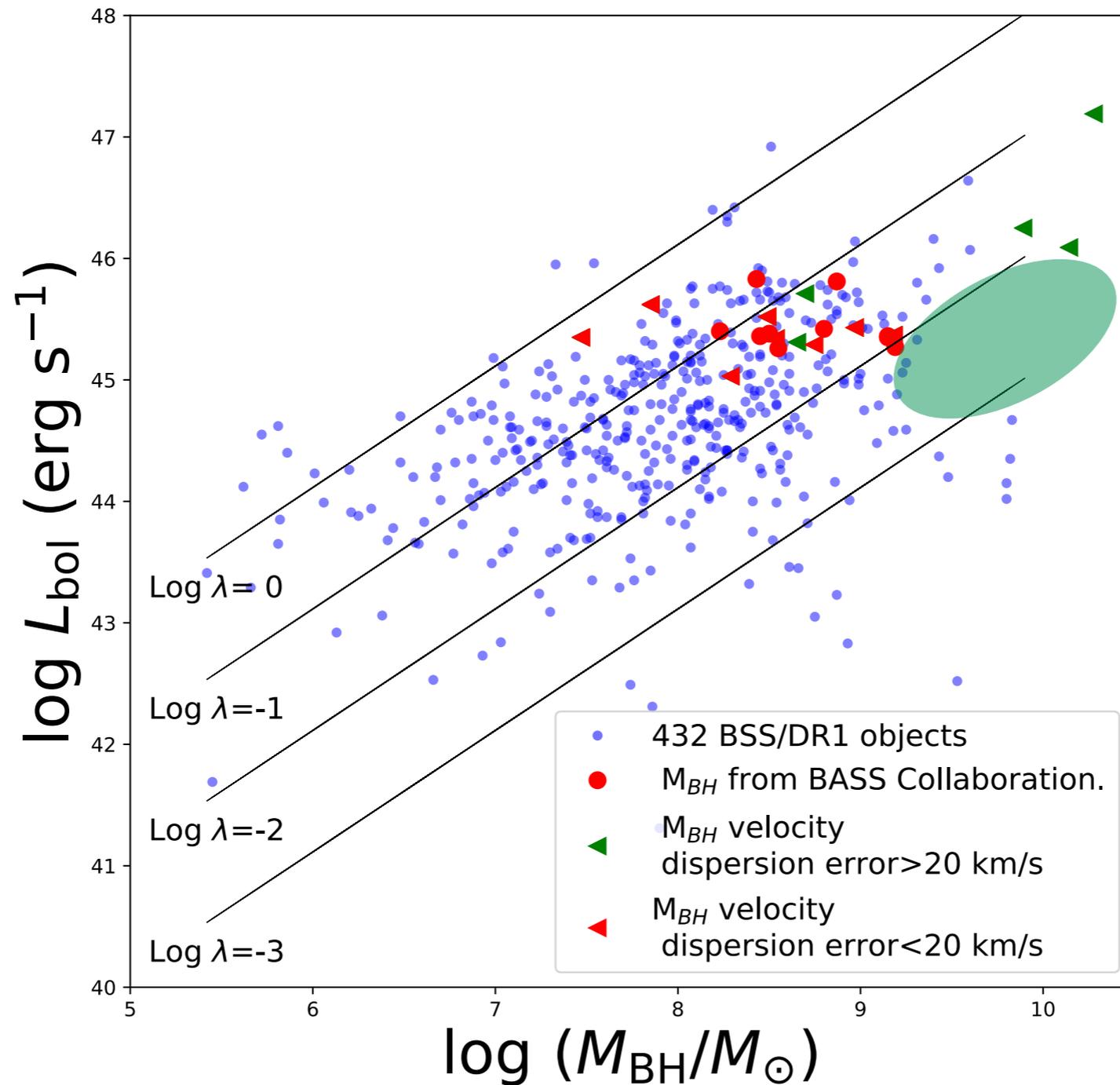


Eddington ratios

High luminosity due to \rightarrow ?



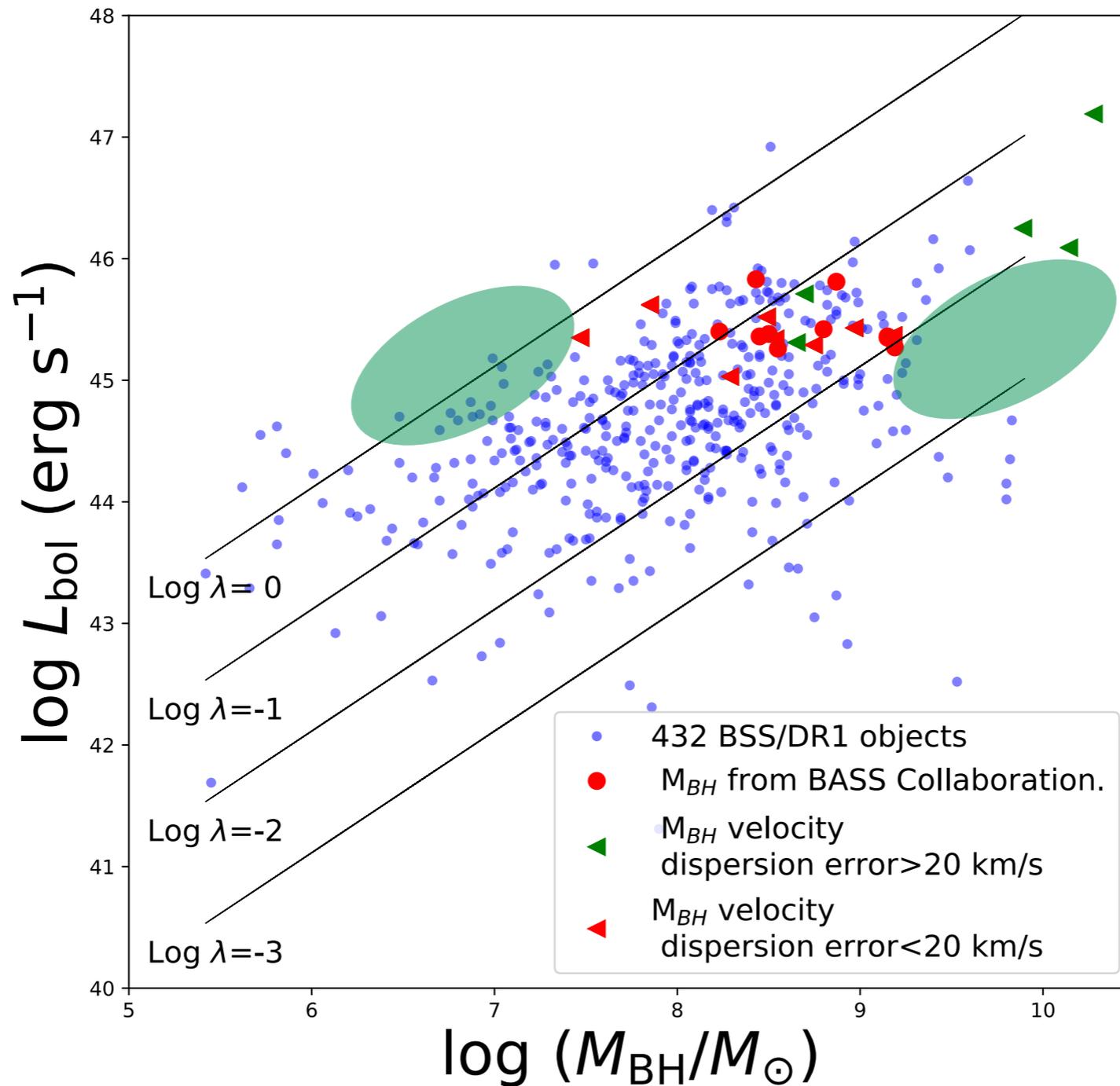
Eddington ratios



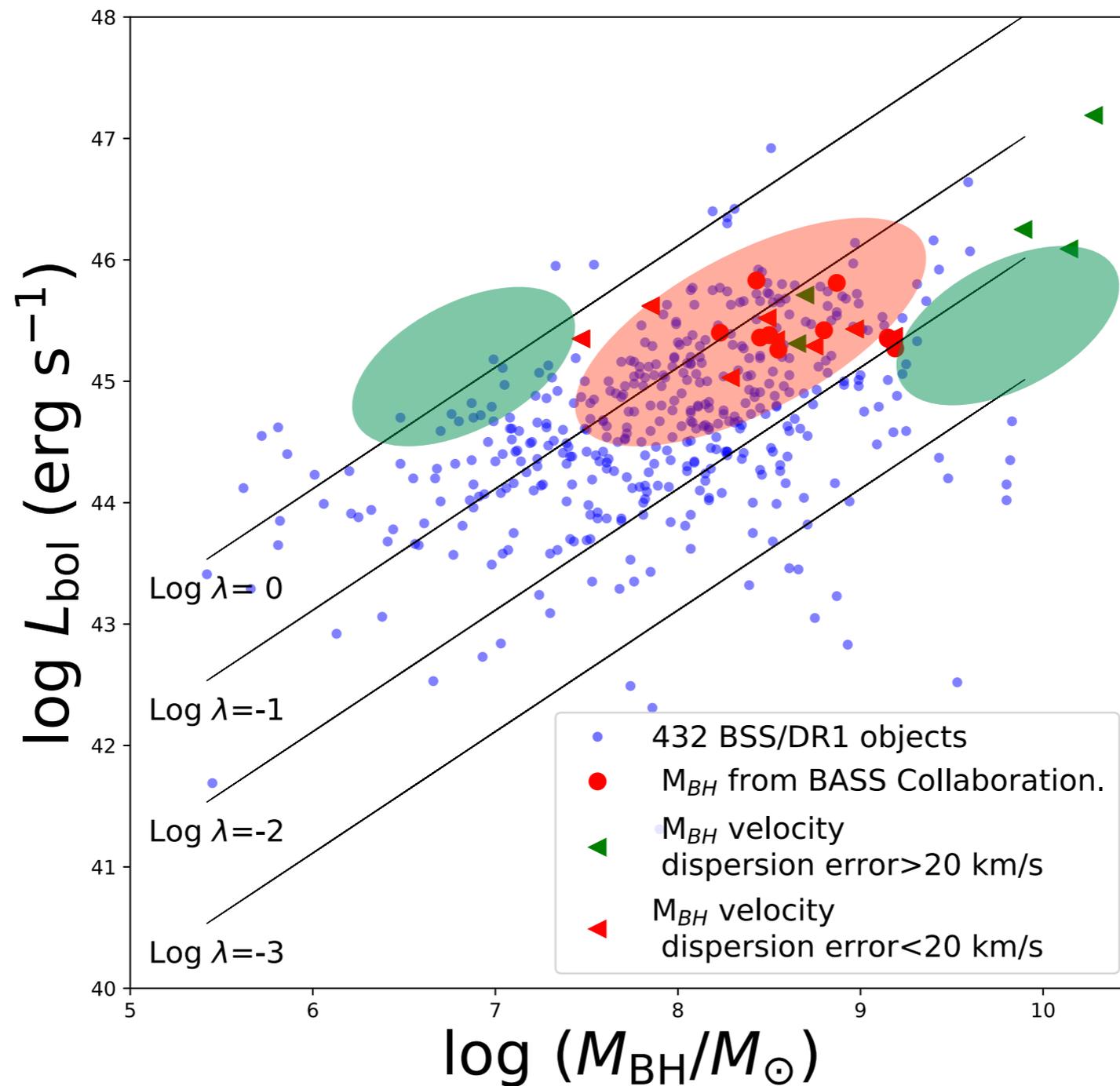
high mass low λ

Eddington ratios

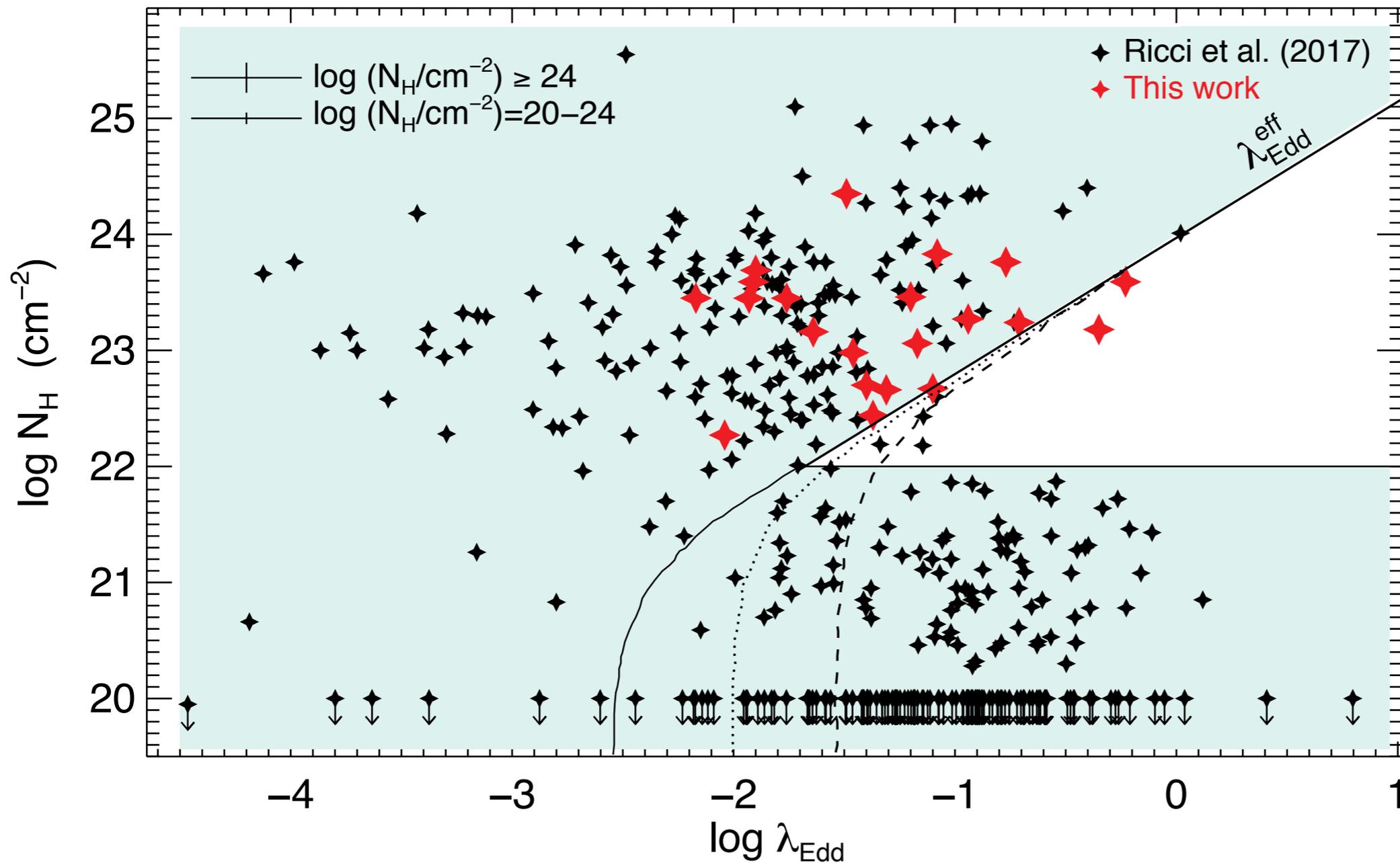
low mass high λ



Eddington ratios



Eddington ratio vs column density



region where radiation pressure would push out the obscuring material from the torus.

Ricci et al., 2017c

Conclusions

- **The most luminous type-2 AGN of the BASS/DR1 catalog as a group do not show any common characteristics**
- **Although they have been selected purely based on hard X-rays and narrow emission lines, they are classified robustly as obscured AGN by their column densities and by optical & infrared diagnostics**

Conclusions

- **Their host galaxies are predominantly ellipticals in apparent disagreement with other studies**
- **Their host galaxies cover a wide range of stellar masses**

Conclusions

- **Their radio properties - luminosity, morphology, existence of radio lobes - are very diverse**
- **Their black hole masses cover a range of $7.5 < \log(M_{\text{BH}}/M_{\text{sol}}) < 10.3$**
- **Their accretion rates extend over wide range $-0.2 < \log \lambda_{\text{Edd}} < -2.2$**

Conclusions

- **Based on their position in the $\lambda_{\text{Edd}} - N_{\text{H}}$ plane they are compatible with the radiative feedback driven unification scenario.**

