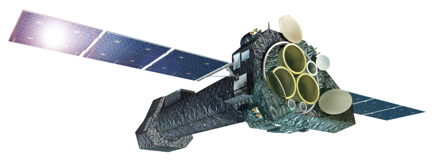

Third Catalog Release of Stripe 82X: Black Hole Masses & New Spec-zs

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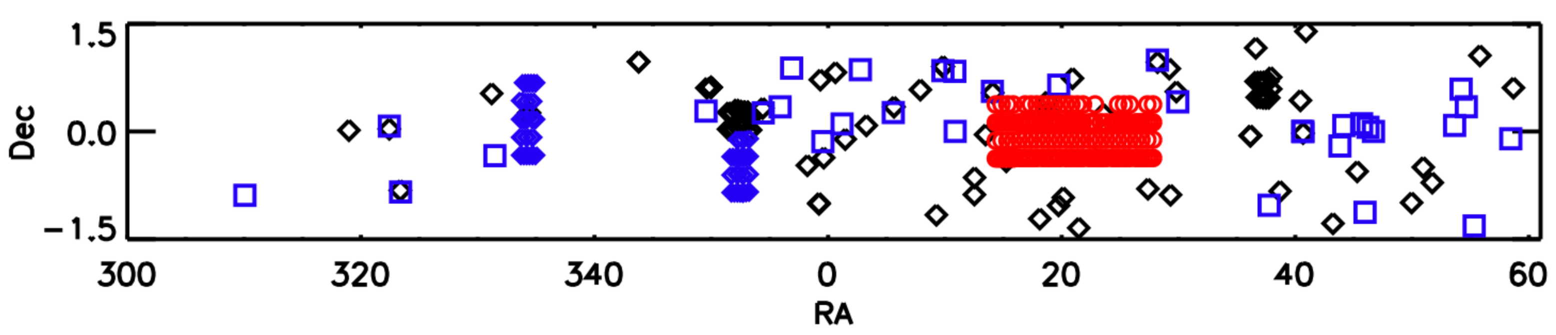
What is Stripe 82X?

- Wide area X-ray survey overlapping legacy SDSS Stripe 82 field featuring extensive multi-wavelength coverage
- Designed to uncover evolution of rare **luminous, obscured AGN**
- X-ray data from:
  - ◇ Archival Chandra (7.4 deg^2)[1]
  - □ Archival XMM (6 deg^2)[2]
  - ◇ XMM-AO10 (4.6 deg^2)[2]
  - ○ XMM-AO13 (15.6 deg^2)[3]



Stripe 82X Demographics

Category	Full Survey	*XMM*-AO10 & *XMM*-AO13 ($r < 22$, AB)
X-ray Sources	6181	2194
Spectroscopic Redshifts	3457	1969
Spectroscopic Completeness	56%	90%
X-ray AGN	3211	1836
Type 1 AGN	2569	1490
Type 2 AGN	628	342
Optical, X-ray weak AGN	6	5
Galaxies	94	50
Stars	142	76
Area	31.3 deg^2	20.2 deg^2

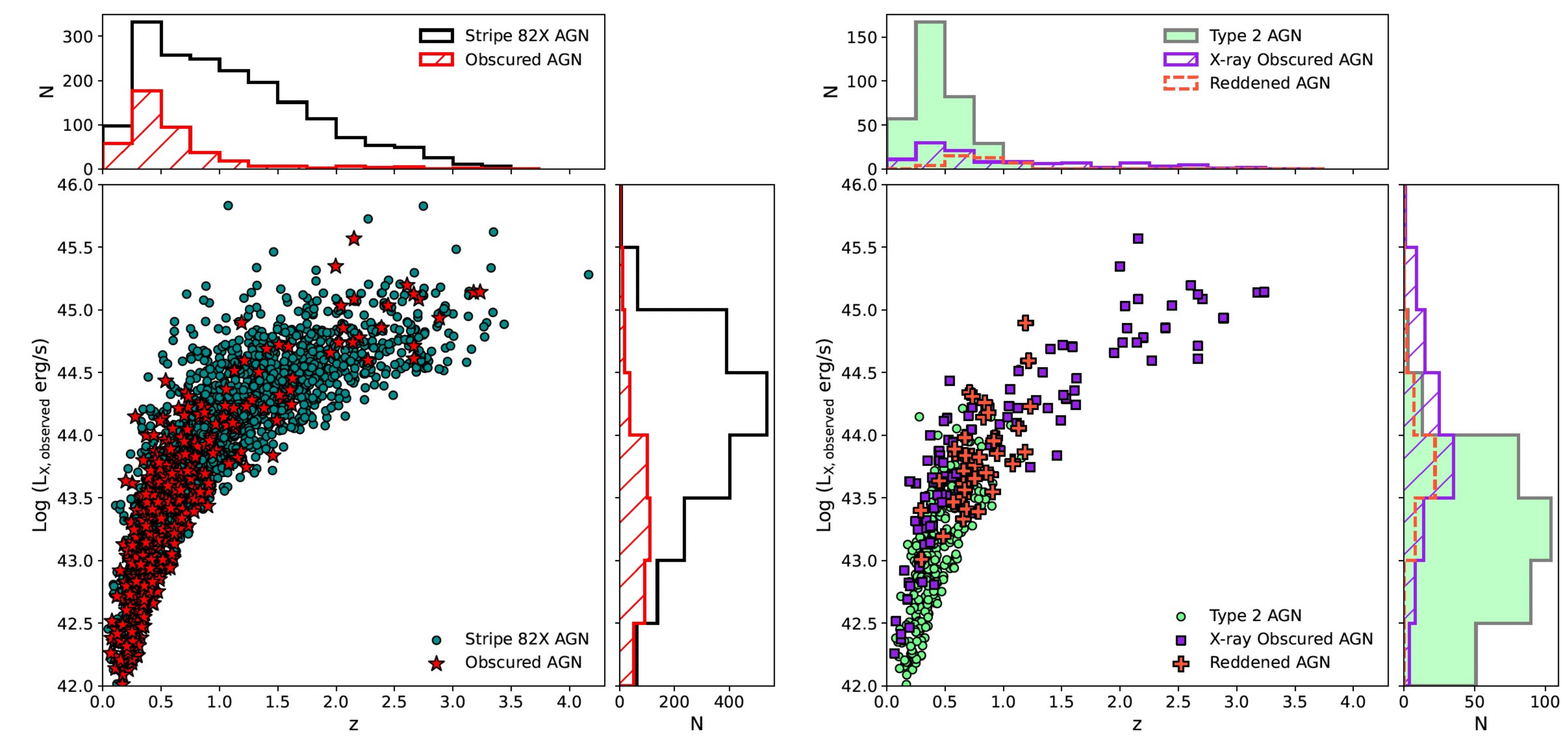
X-ray AGN: $L_{2\text{-}10keV} > 10^{42}$ erg/s; Optical, X-ray weak AGN: $L_{2\text{-}10keV} < 10^{42}$ erg/s, broad lines in optical spectra

Stripe 82X Data Release 3

- **Combines in one user-friendly catalog:**
  - X-ray source properties from Data Release 1[3]
  - Multiwavelength counterparts, photometry, and photometric redshifts from Data Release 2[4]
  - Redshifts from SDSS eBOSS Stripe 82X survey[5]
- **What's new in Data Release 3?**
  - 343 newly published spectroscopic redshifts
    - Extensive follow-up campaign with Palomar & Keck
    - Achieved 90% completeness in contiguous regions with homogeneous X-ray coverage (XMM-AO10 & XMM-AO13) at r < 22
  - Black hole masses (M_{BH}) calculated for 1297 Type 1 AGN

Obscured AGN in Stripe 82X

XMM-AO10 & XMM-AO13, r < 22

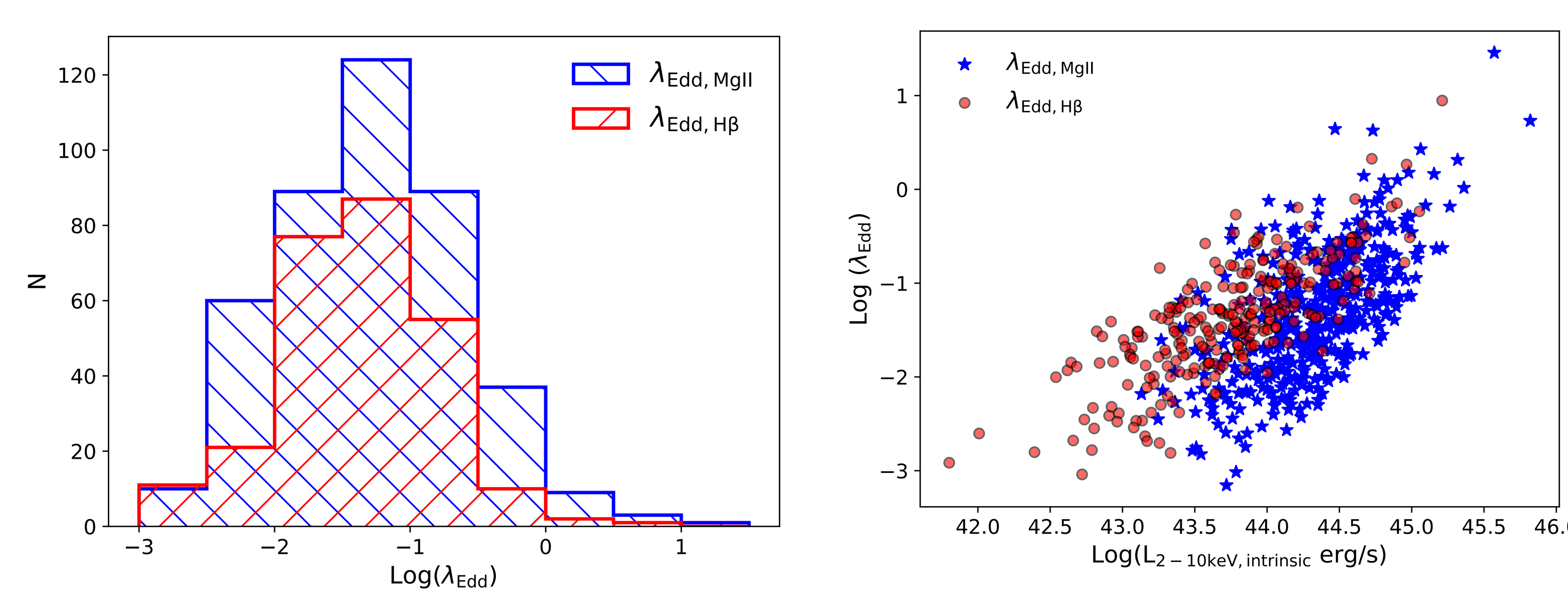


Type 2: no broad lines in optical spectra; Reddened: R - K > 4 (Vega); X-ray Obscured: $N_H > 10^{22}$ cm^{-2}[6]

- Obscured AGN dominate at lower luminosities and redshifts (receding torus model)
- Type 2 AGN at lower L_x ($< 10^{44}$ erg/s) & z (< 1)
- Reddened AGN at moderate L_x ($>10^{43.5}$ erg/s) & z ($0.25 < z < 1.25$)
- X-ray obscured extended to highest L_x ($>10^{44.5}$ erg/s) & z (>1)
- Most X-ray obscured AGN are Type 1 AGN (distinction between gas that obscures X-rays and dust that obscures optical emission?)

Black Hole Masses

- M_{BH} from virial mass formulas using broad Hβ[7], MgII[7], Hα[8], CIV[7] lines
  - $M_{BH,H\beta}$ samples low-z, $M_{BH,MgII}$ samples high-z
- Eddington ratio (λ_{Edd}) from $L_{x,intrinsic}$[6], κ_{Bol}[9], & L_{Edd} assuming M_{BH}



- Most AGN accreting below 10-30% Eddington
- Rapidly accreting black holes ($\lambda_{Edd} > 0.3$) hosted in more luminous AGN ($L_x > 10^{45}$ erg/s)

➔ Consistent with picture that the bulk of mass accretion occurs in phase when AGN is luminous[10,11]

See LaMassa+ 2024 (ApJ, 974, 235) for more information and Peca+ 2024 (ApJ, 974, 156) for Stripe 82-XL

References:

[1]LaMassa et al. 2013a, MNRAS, 432, 1351; [2]LaMassa et al. 2013b, MNRAS, 436, 3581; [3]LaMassa et al. 2016, ApJ, 817, 172; [4]Ananna et al. 2017, ApJ, 850, 66; [5]LaMassa et al. 2019, ApJ, 876, 50; [6]Peca et al. 2023, ApJ, 943, 162; [7]Shen et al. 2024, ApJS, 272, 26; [8]Greene et al. 2010, ApJ, 709, 937; [9]Duras et al. 2020, A&A, 636, A73; [10]Kollmeier et al. 2006, ApJ, 648, 128; [11]Hopkins & Hernquist 2009, ApJ, 698, 1550