AN EXTREME POPULATION OF HEAVILY BURIED AGN

TORUS2018 CHRISTOPHER M CARROLL PUERTO VARAS — 12 DEC 2018





MOTIVATION

- Large¹ samples of AGN for statistical purposes
- Confirm SED modeling with independent methods
 - IR-selection, optical spectral lines, strong X-ray detections²
- X-ray weak AGN?
 - Stern+15, Lansbury+15, Simmonds+16, Yan+18³, Laha+18, etc., etc., etc.
- Because, science!

¹I mean *very* large.
²Uh oh.
³See poster Friday!

SED MODELING

- Low-resolution galaxy + AGN templates (Assef+10)
- Star-forming galaxy (SFG2; Kirkpatrick+15)





```
Calisto Rivera+16
```

SAMPLE SELECTION

SDSS+WISE footprint



GALEX, UKIDSS, unWISE (Lang+14)



SAMPLE SELECTION

SDSS+WISE footprint



GALEX, UKIDSS, unWISE (Lang+14)



CANDIDATE AGN LUMINOSITY

Conservative dereddened L_{6µm} (cut on L_{15µm})



X-RAY SURVEYS: NUSTAR

- Combined NuSTAR catalogs
 - ECDFS: Mullaney+15
 - COSMOS: Civano+15
 - SSC: Lansbury+17
 - UDS: Masini+18



NUSTAR FLUX LIMIT

- Estimate NuSTAR
 flux limit from
 combined catalogs
- Overlap with
 XMM+Chandra fields
- ~1000 sources in 2+
 fields with no X-ray
 detection



OBSERVED NH DISTRIBUTION

NuSTAR observed QSO2 column densities



SED LIR TO LX(IR)

▶ L_{2-10keV}-L_{6µm} (Chen+17)





X-RAY DETECTIONS AND UPPER LIMITS



SAMPLE LUMINOSITY + NH DISTRIBUTION

Sample L15 NH distribution $\Rightarrow L_{obs}/L_{int}$: require modeling





- Goal: match # det./non-det.
- Need: heavily buried population





CONCLUSIONS

- > SED modeling is a first approach for large AGN studies
- Found a large population of X-ray undetected AGN in archival data
- Heavy obscuration (CT regime) needed to match observations

FUTURE WORK

Link galaxy properties to nuclear obscuration