Universiteit Leiden

# AGNs* are not special: stellar populations in the nuclei of ultra hard X-ray selected AGNs

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Ric Davies, Turgay Çağlar, Rogério Riffel, David Rosario, Taro Shimizu and the LLAMA team

* **On the plural of "AGN"** *(it, too, is not special)*
We use AGN as a word (we don't always expand to "active galactic nucleus"), i.e. the word is "lexicalised". It then follows regular English grammar for forming the plural: an "s" is added. The Latin declension of "nucleus" is not relevant. The plural of AGN is AGNs.

The sample: 20 AGNs + 19 control galaxies

see also **poster 1E** (Ric Davies) for more LLAMA results
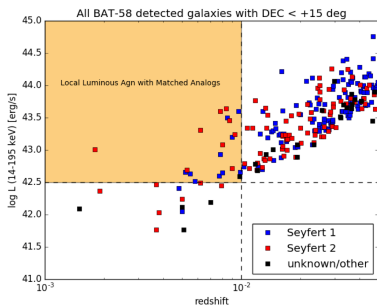
Sample selection

- hard X-ray selected (unbiased against dust)
- local (to resolve the central 100 pc)
- luminous (to study coherent AGN feeding mechanisms rather than "weather")
- volume-complete (to say something about the population)
- control sample matched by distance, inclination, luminosity and Hubble type

## Stellar population synthesis: STARLIGHT + BC03

Typical control galaxies

Typical AGNs
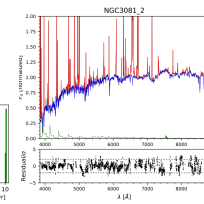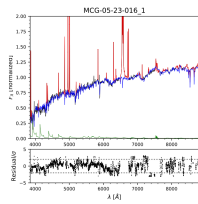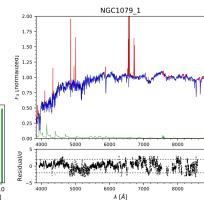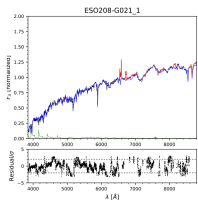
VLT/X-SHOOTER UVB + VIS spectra, 1.8 x 1.8" (100-300 pc diameter) extraction at the true NIR position of the nucleus

Observations & Analysis

- Iterative masking of emission lines (effectively via sigma-clipping); very robust results
- Stellar population synthesis with STARLIGHT / BC03 stellar library
- fixed metallicity at solar
- derive non-parametric star-formation history

A closer look at the sample: emission line analysis
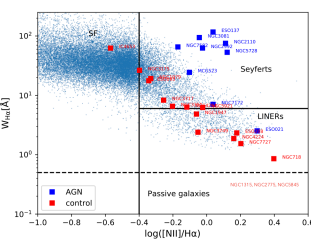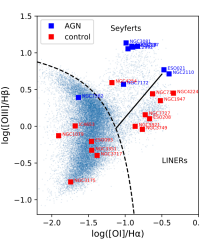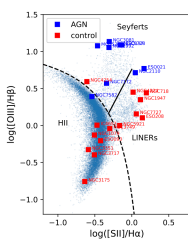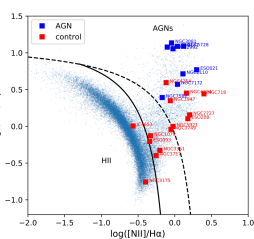


- Both from line ratio plots (BPT / Veilleux) and from the equivalent widths of emission lines ("WHaN" plot; Cid Fernandes et al.), our AGNs are clearly in the AGN regions
- The control galaxy sample is split between star-forming and non-star-forming (passive) galaxies

The nuclear SFH of AGNs and control galaxies

4 age bins:

- young (<30 Myr)
- young-intermediate (30-300 Myr)
- intermediate-old (0.3-3 Gyr)
- old (> 3 Gyr)

Burtscher et al. (in prep)
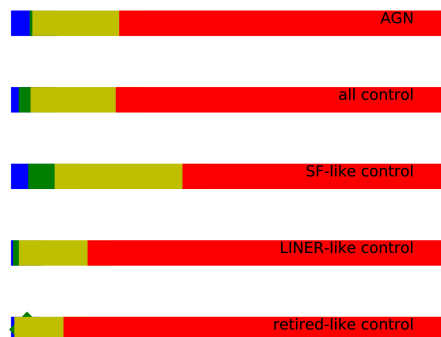
Results & Conclusions

- Bulge stars dominate all samples; only small differences between samples
- The nuclear star formation history of LLAMA AGNs is most similar to star-forming inactive galaxies
- Since pre-requisites for AGN activity (cold, low-angular momentum gas) are the same as for (nuclear) star forming galaxies, it is not surprising to find their SFHs to be similar.
- AGNs are not special.