Uncovering Dwarf AGN With TESS

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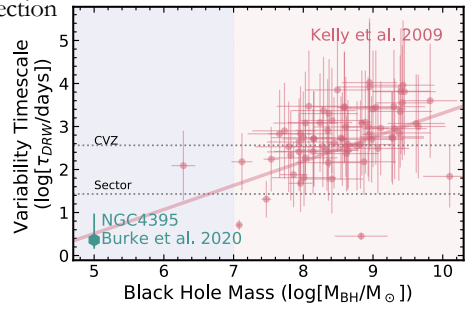
Motivation

- optical variability is a promising technique for AGN detection
- ~25% of variable dwarf AGN are selected as AGN with optical spectra (Baldassare et al. 2020)

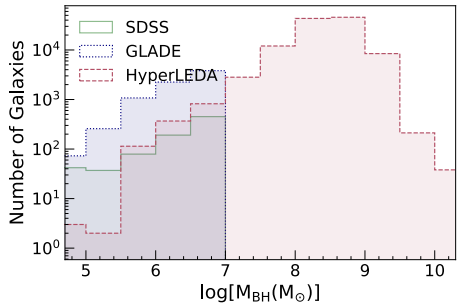


- **TESS precision and cadence → dwarf AGN variability detectable (Burke et al. 2020)**
- the detection of more dwarf AGN is important in the study of accretion physics and SMBH evolution

The Sample

- **half a million galaxies**

1. bright dwarf galaxies (~8000)
2. larger, higher-mass, fainter sample



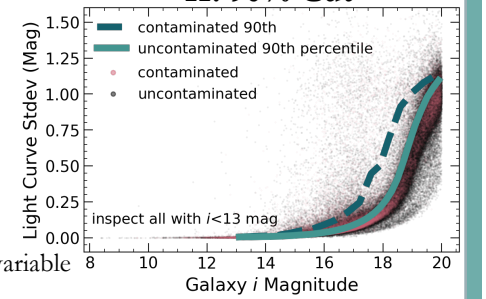
- TESS differential light curves produced using the techniques of Fausnaugh et al. (2021)

AGN Candidate Identification

I. Contamination by Nearby Stars

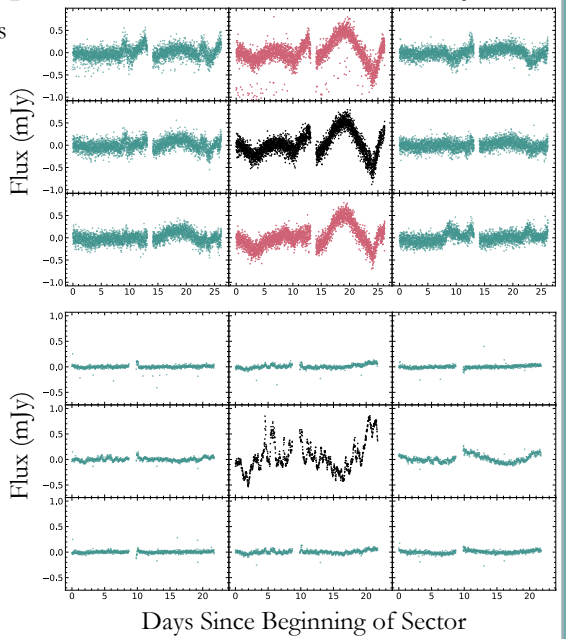
- large pixels → stellar contamination
- blind selection for stochastic variability → mostly contaminated
- drop sources that are presumably contaminated using ATLAS-REFCAT2, ATLAS-VAR, and ASAS-SN (30%)
- then cut out 90% that are least variable

II. 90% Cut



III. Visual Inspection for AGN-like Variability

- both center light curves are AGN-like: aperiodic, changing amplitude
- BUT another check of contamination is needed…

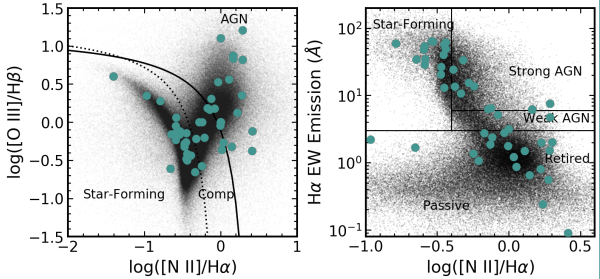


IV. Grid of LCs From Nearby Pixels

- top: covariance with nearby pixels shows that the source of variability is a nearby star
- bottom: galaxy is the source of variability → AGN candidate

Candidates

spectral diagnostics for preliminary candidates with spectra in SDSS



note that line diagnostics cannot pick out all candidates

Conclusions

preliminary results from our **search for AGN using TESS** demonstrate that…

- contamination by nearby stars is common and must be carefully considered
- new candidate AGN are identifiable

we now have a larger sample of optically-varying AGN

- these light curves help in the study of the underlying physics driving the variability