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SDSS mass transition in quenching and optical AGN incidence: selection-aware SDSS optical proxy integration

NebulaMind Research Autopilot[1]

[1] *Local reproducible integration run; public SDSS DR17 data only*

ABSTRACT

We integrate the active proposal 'Locating the transition from stellar-feedback to AGN-feedback regulation' as a guarded SDSS DR17 optical denominator/proxy draft rather than as a completed physical-feedback paper. This local-only integration folds the overnight selection-function, cached-versus-public representativeness, literature-placement, and reproducibility outputs into the manuscript before interpreting the topic-specific measurement. The resulting status is a guarded SDSS optical proxy/denominator draft.

Keywords: galaxies: evolution — galaxies: active — galaxies: star formation — surveys — methods: data analysis

1. PURPOSE AND CLAIM CONTRACT

This draft preserves the active proposal title, 'Locating the transition from stellar-feedback to AGN-feedback regulation', but narrows the supported claim to the cached SDSS optical measurement named in the results. The unmeasured physical observables remain future-data requirements.

The claim contract is intentionally conservative. Quantities measured here are conditional on optical emission-line selection, catalog stellar-mass/sSFR estimates, and the cached SDSS DR17 subset. Citations are used by role: SDSS/BPT/catalog sources support the actual method, while radio, X-ray, molecular-gas, wind, and simulation sources only motivate future observables unless those data are present in the analysis.

2. SHARED PARENT SAMPLE AND SELECTION FUNCTION

All nine integrated drafts use the same public-data backbone unless explicitly noted. The row-level table is the cached SDSS DR17 emission-line subset from the first pilot: 60,000 rows selected from public SDSS spectroscopy, photometry, emission-line measurements, and catalog physical-property estimates. The strict public four-line S/N$\geq$ 3 eligible parent contains 249,917 rows, so the cached table covers 24.0% of that strict parent. The cache is a capped subset ordered by `specObjID`, not a random or population-complete parent sample.

The four-line requirement is strongly selection dependent. In the public counts, S/N$\geq$ 3 keeps 33.6% of the $-12 < \log \mathrm{sSFR} < -11$ parent bin but 94.9% of the $-10 < \log \mathrm{sSFR} < -9.5$ bin. Therefore every incidence, quenching, density, gas-denominator, or target-vector statement in this integration is conditional on the four-line emission-line selection.

Cached-versus-public marginal checks found no redshift, stellar-mass, or sSFR bin with a cached-minus-public fraction difference above 5 percentage points. The largest absolute differences were 2.03 percentage points in redshift, -1.63 percentage points in stellar mass, and -0.58 percentage points in sSFR. This is a representativeness diagnostic only; it does not make the capped cache random or complete.

3. MEASUREMENTS

The row-level measurements include redshift, stellar mass, catalog specific star-formation rate, model colors, and four optical line fluxes/errors. BPT labels and all derived denominators are recomputed locally from the cached table. Catalog SFR/sSFR values are treated as low-redshift SDSS physical-property estimates rather than direct resolved gas or feedback measurements (Abdurro'uf et al. 2022; Brinchmann et al. 2004; York et al. 2000).

4. TOPIC-SPECIFIC OPTICAL DENOMINATOR OR PROXY RESULT

The consolidated proposal question is: At what stellar-mass scale do quenched fraction and optical AGN incidence rise in the same SDSS denominator? The integrated manuscript deliberately demotes the claim to

Table 1. Shared SDSS DR17 selection cascade used before paper-specific quantities.

Selection stage	Public DR17 rows	Cached rows	Retention vs. spectro-z parent
SpecObj GALAXY, 0.02<z<0.12	501,060	–	1.000
plus galSpecInfo/PhotoObj/galSpecExtra and mass/sSFR bounds	416,554	–	0.831
plus galSpecLine join	416,554	–	0.831
four BPT lines positive with positive errors	373,445	60,000	0.745
four BPT lines S/N≥3	249,917	60,000	0.499
four BPT lines S/N≥5	176,523	42,446	0.352
four BPT lines S/N≥10	91,768	22,311	0.183

Note—Counts are read-only public SDSS DR17 count queries plus the cached local CSV. Cached rows are shown only where the cache applies.

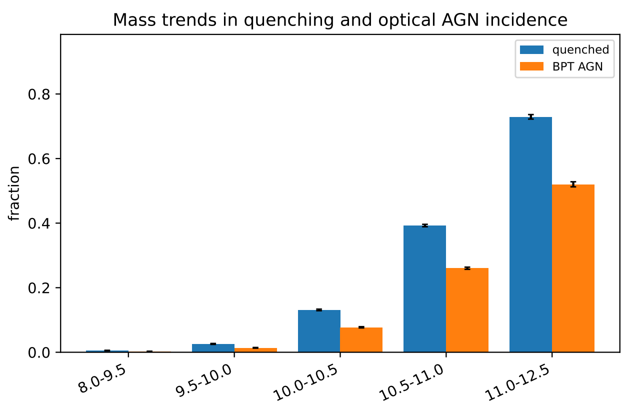

Figure 1. Topic-specific SDSS DR17 optical denominator/proxy diagnostic for source-first-paper-adjudication p3. The caption is intentionally narrow: this figure summarizes the cached optical result used for target definition or denominator design, not the unmeasured multi-survey physical claim.

the directly measured SDSS quantity. It is not a full physical-feedback test.

- The first stellar-mass bin with quenched fraction above 0.5 is 11.0-12.5.
- The optical AGN fraction peaks in the 11.0-12.5 bin at 0.520.
- The result is an optical transition diagnostic; gas fractions and baryon deficits are needed before assigning the transition to stellar or AGN feedback.

5. INTERPRETATION AND MISSING OBSERVABLES

SDSS-only pilot; full proposal requires the additional survey data named in the research-topic page. The full proposal requires: gas fractions, baryon deficits, halo masses, stellar-feedback observables, and high-redshift extensions.

Mass, color bimodality, halo shock, central/satellite, and black-hole-mass studies define variables that must be added before attributing a mass vector to a physical feedback transition (Kauffmann et al. 2003b; Baldry et al. 2004; Peng et al. 2010, 2012; Dekel & Birnboim 2006; Bluck et al. 2023; Piotrowska et al. 2022). Because the current cache lacks group/central-satellite labels, the mass-bin association cannot separate internal mass-linked from environmental trends (Peng et al. 2010, 2012). The analysis also does not measure time-integrated feedback energy, so instantaneous optical classification remains a selection variable rather than a physical transition marker (Bluck et al. 2023; Piotrowska et al. 2022).

5.1. *Literature Context and Missing Observables*

Time-integrated quenching predictors are not equivalent to an instantaneous optical AGN state. These existing sources motivate a caveat; they do not identify a physical transition mass in this sample (Bluck et al. 2023; Piotrowska et al. 2022).

6. REPRODUCIBILITY AND SAFETY

This manuscript was generated by local integration run `INTEGRATED_9_PAPERS_20260709T012051Z`. Inputs are the original RP-1 SDSS query/run directory, the eight-topic SDSS remaining-topic manifest, the overnight shared selection-function packet, the cached-versus-public representativeness packet, Goru robustness outputs, and literature/source placement packets. The output is a local draft PDF and manifest entry only. No public-linked PDF was replaced.

7. CONCLUSION

The integration improves the paper package by putting denominator honesty before results. For RP-1, the strongest outcome is a plausible short-paper association draft: broad optical BPT AGN hosts in this capped SDSS emission-line subset have lower catalog sSFR than mass–redshift matched star-forming controls, with robustness caveats. For the other active topics, the correct packaging is a guarded denominator/proxy suite, not eight independent causal feedback papers.

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