

Classifications of Emission-Line Galaxies with SDSS & WISE

Final Project

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Task 1: BPT and WHAN on a Complete Sample

1. BPT Diagrams

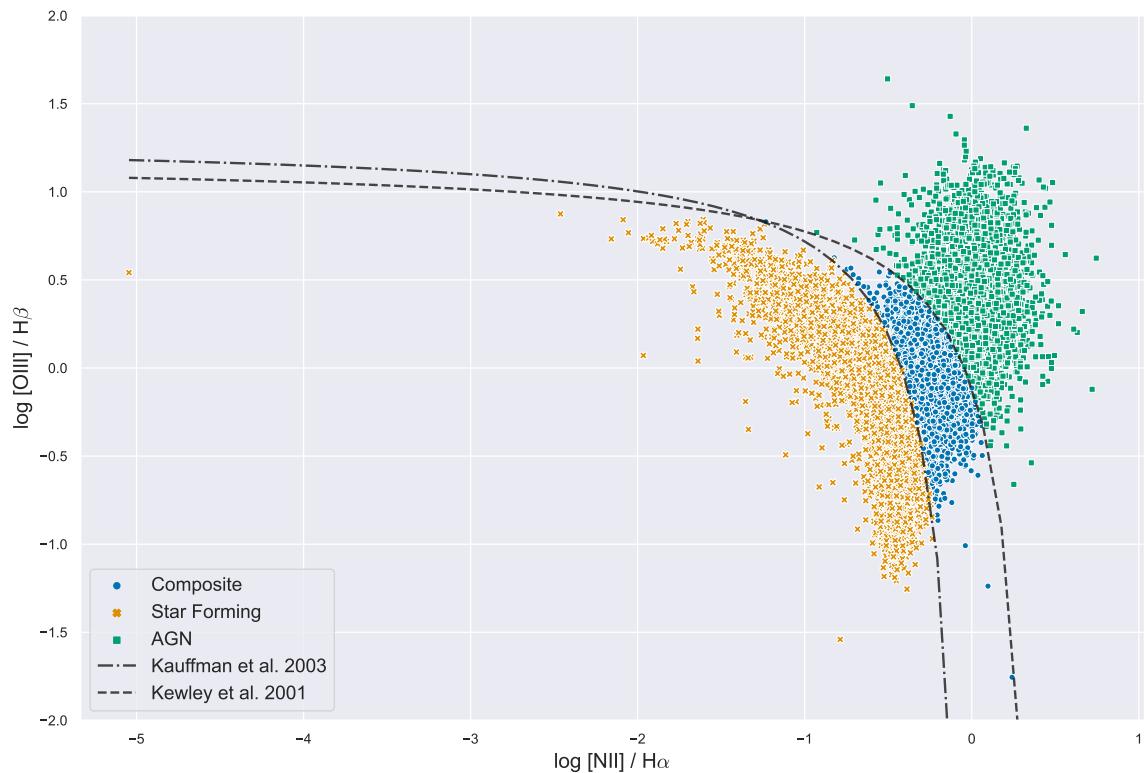


Figure 1: BPT Diagram: $[\text{NII}] / \text{H}\alpha$ vs $[\text{OIII}] / \text{H}\beta$.

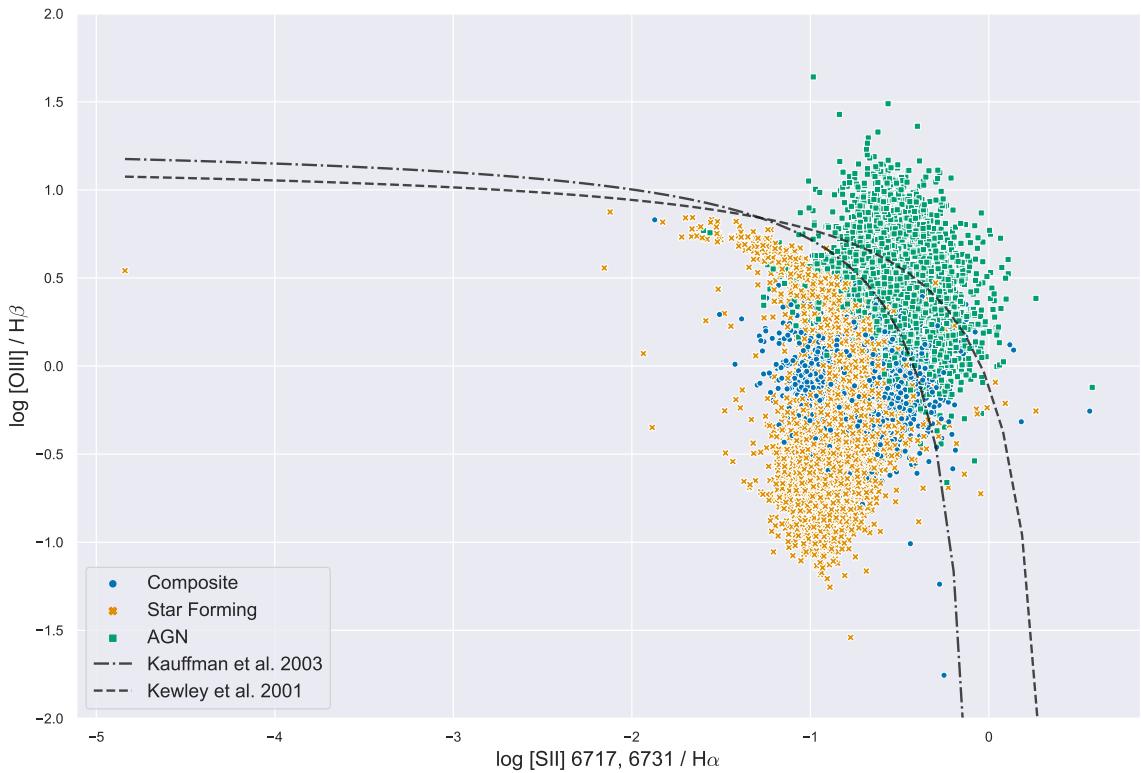


Figure 2: BPT Diagram: $[\text{SII}] / \text{H}\alpha$ vs $[\text{OIII}] / \text{H}\beta$.

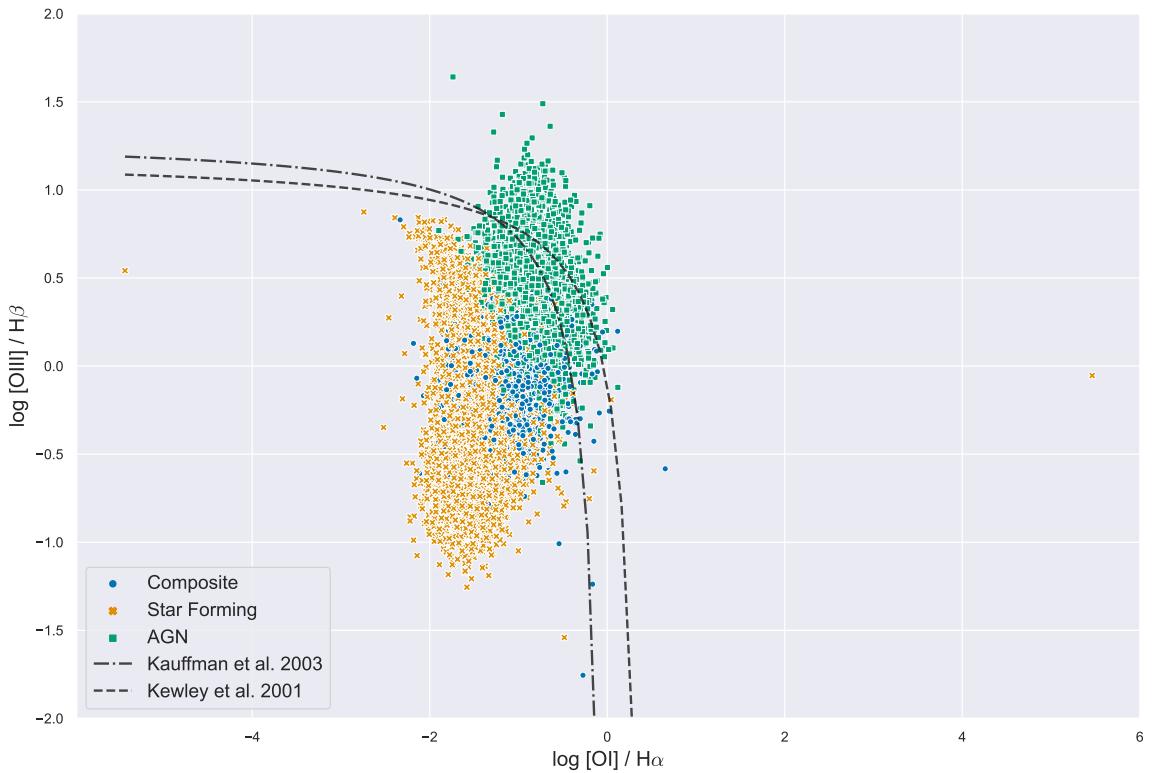


Figure 3: BPT Diagram: $[\text{OII}] / \text{H}\alpha$ vs $[\text{OIII}] / \text{H}\beta$.

2. WHAN Diagram

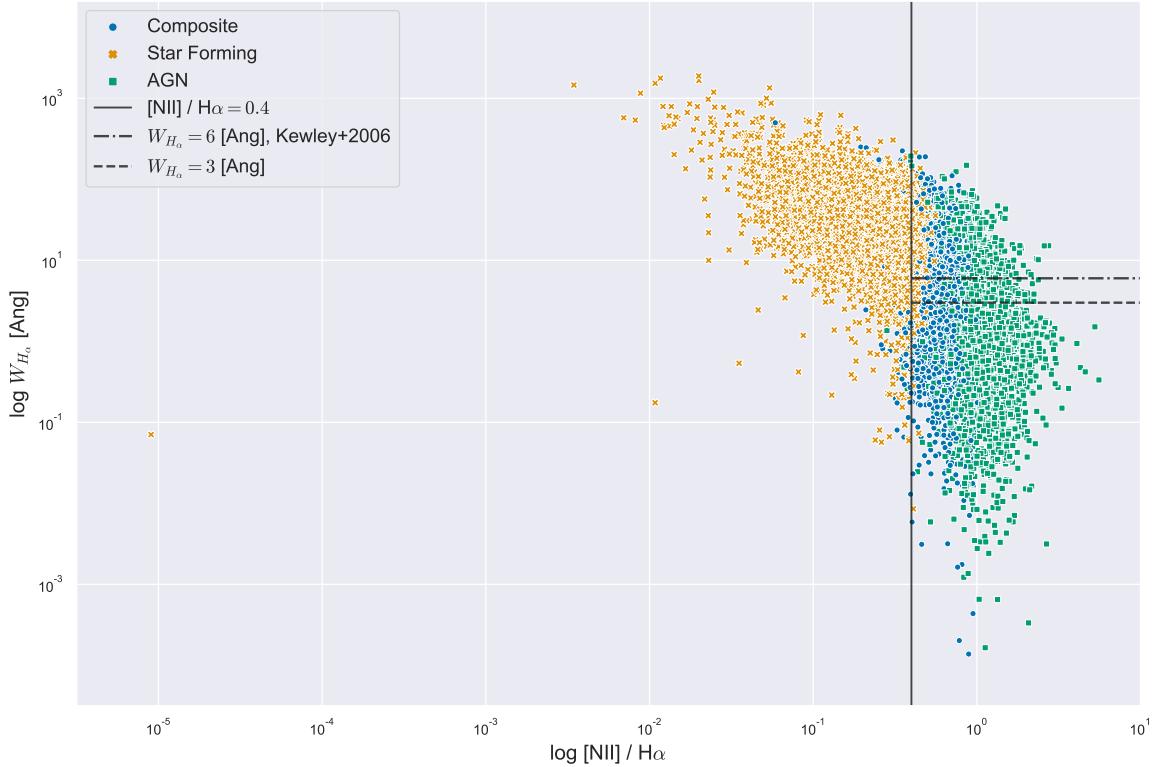


Figure 4: Whan Diagram: $[\text{NII}] / \text{H}\alpha$ vs $W_{\text{H}\alpha}$ [Ang].

Task 2: BPT and TBT on a Subsample

3. BPT Diagram

4. TBT Diagram

Task 3: WISE color-color diagram on an AGN Subsample

Code 1: SQL Query

```

1  SELECT TOP 30000 s.specobjid, s.plate, s.mjd, s.fiberID,
2  s.subclass, s.z,
3  g.oiii_5007_flux, g.oiii_5007_flux_err,
4  g.h_alpha_flux, g.h_alpha_flux_err,
5  g.h_beta_flux, g.h_beta_flux_err,
6  g.nii_6584_flux, g.nii_6584_flux_err,
7  g.sii_6717_flux, g.sii_6717_flux_err,
8  g.sii_6731_flux, g.sii_6731_flux_err,
9  g.oi_6300_flux, g.oi_6300_flux_err,
10 g.h_alpha_reqw, g.h_alpha_reqw_err
11
12 FROM GalSpecLine AS g
13 JOIN SpecObjAll AS s ON g.specobjid = s.specobjid
14
15 WHERE
16 (s.class = 'QSO' or s.class = 'GALAXY')
17 AND s.z <= 0.3
18 AND 2.355 * g.sigma_balmer <= 700
19 AND 2.355 * g.sigma_forbidden <= 700
20 AND g.oiii_5007_flux <> 0
21 AND (g.oiii_5007_flux / g.oiii_5007_flux_err) > 1
22 AND g.h_alpha_flux <> 0
23 AND (g.h_alpha_flux / g.h_alpha_flux_err) > 1
24 AND g.h_beta_flux <> 0
25 AND (g.h_beta_flux / g.h_beta_flux_err) > 1
26 AND g.nii_6584_flux <> 0
27 AND (g.nii_6584_flux / g.nii_6584_flux_err) > 1
28 AND g.sii_6717_flux <> 0
29 AND (g.sii_6717_flux / g.sii_6717_flux_err) > 1
30 AND g.sii_6731_flux <> 0
31 AND (g.sii_6731_flux / g.sii_6731_flux_err) > 1
32 AND g.oi_6300_flux <> 0
33 AND (g.oi_6300_flux / g.oi_6300_flux_err) > 1

```