Emission line classification of galaxies

Indo-French Astronomy School for Optical Spectroscopy

Ayesha Anjum, Jose Gregorio, Rajeshwari Dutta, Pritesh Ranadive

Mentors: Mamta Pommier & David Lagatutta

28 November, 2015

Talk outline

- Motivation & introduction - emission line diagnostics
- Project description & results

BPT Diagram

CLASSIFICATION PARAMETERS FOR THE EMISSION-LINE SPECTRA OF EXTRAGALACTIC OBJECTS

J. A. BALDWIN AND M. M. PHILLIPS

Cerro Tololo Inter-American Observatory,* Casilla 603, La Serena, Chile

AND

ROBERTO TERLEVICH

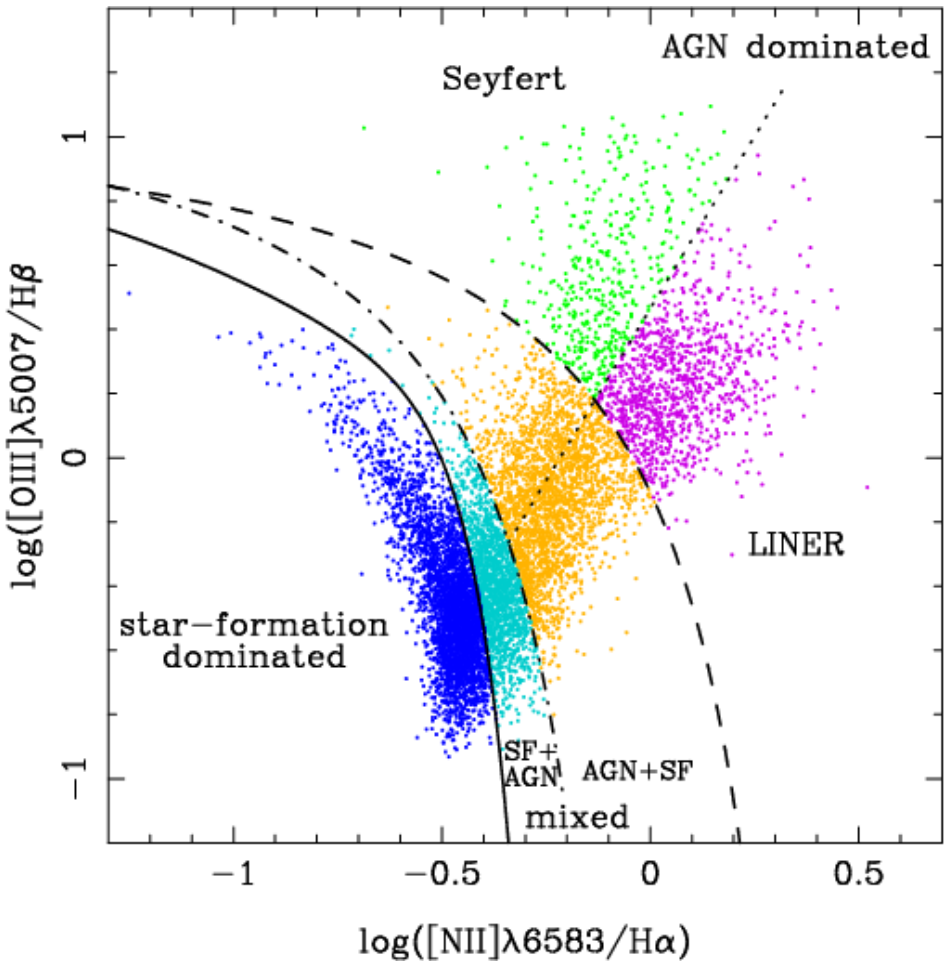
Institute of Astronomy, Madingley Road, Cambridge, England CB3 0HA

Received 1980 August 21

An investigation is made of the merits of various emission-line intensity ratios for classifying the spectra of extr galactic objects. It is shown empirically that several combinations of easily-measured lines can be used to separate objec into one of four categories according to the principal excitation mechanism: normal H II regions, planetary nebulae, ol jects photoionized by a power-law continuum, and objects excited by shock-wave heating. A two-dimensional quantitati classification scheme is suggested.

Key words: H II region—Seyfert galaxies—quasars—spectral classification

BPT Diagram



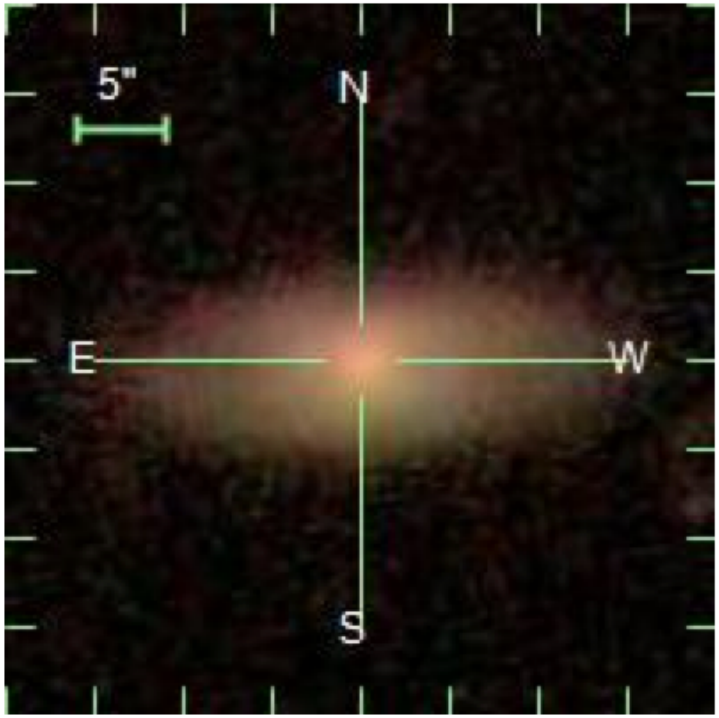
Bamford+08

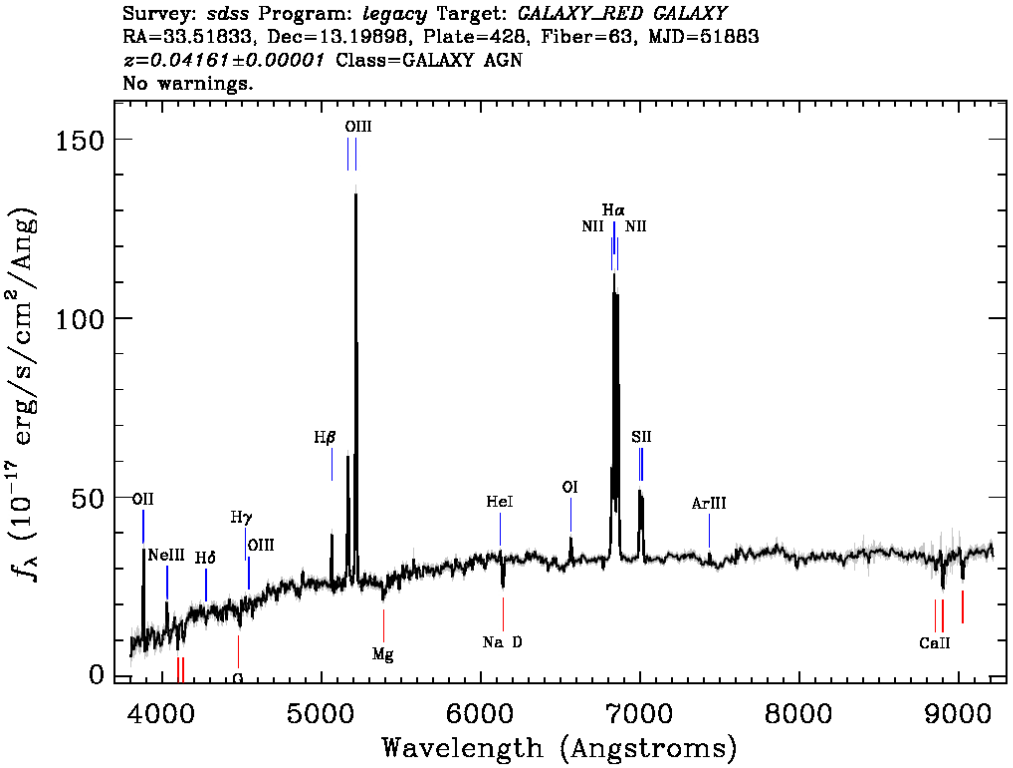
Project outline

- *Aim:* Study emission line properties of galaxies & classify them using the BPT diagram
- Out of sample of 10 galaxies - 3 were passive & 2 at high-z
- Remaining 5 galaxies were classified using the BPT diagram

Galaxy sample

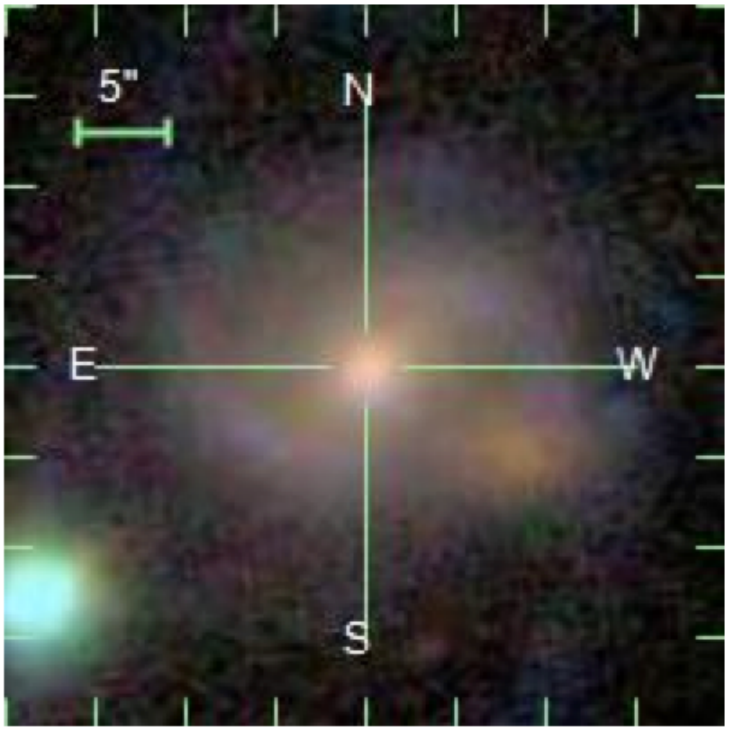
Galaxy 1

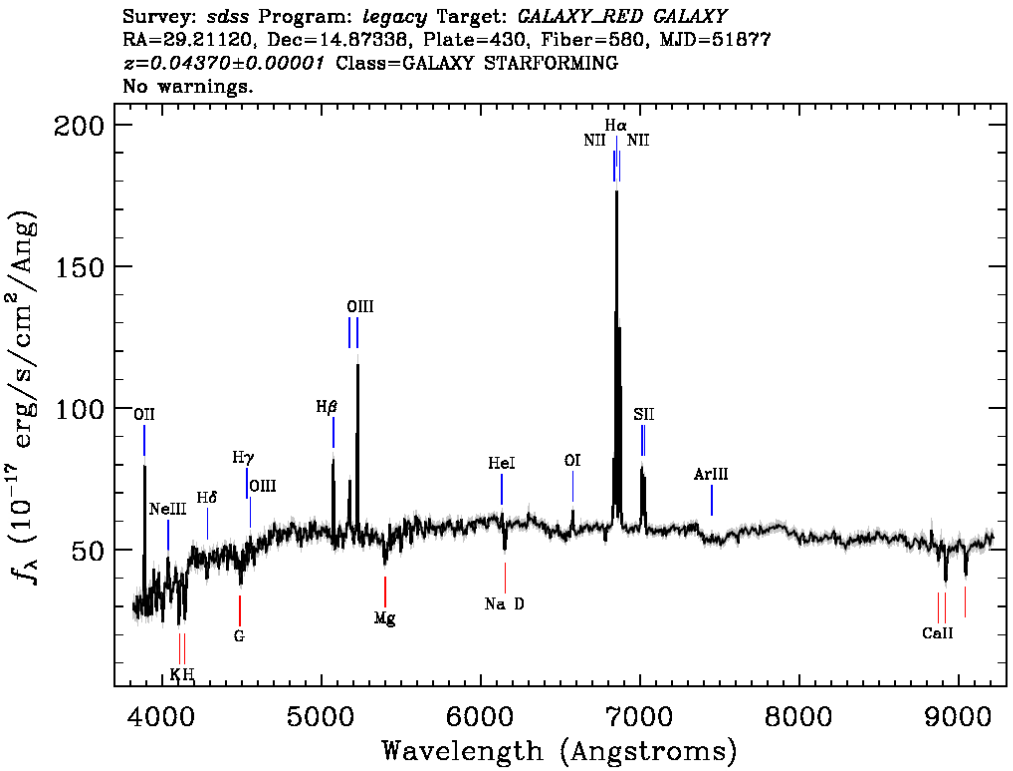




Galaxy sample

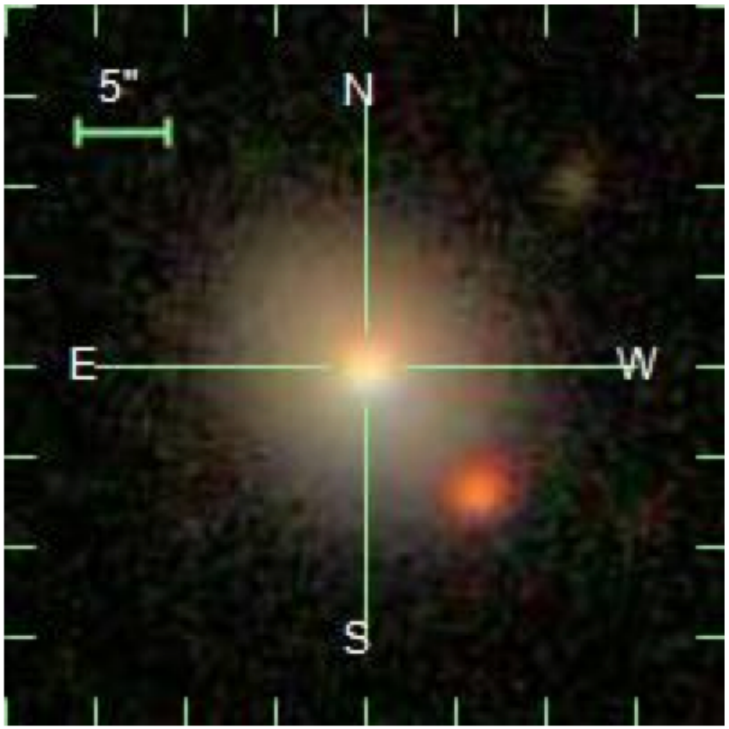
Galaxy 2

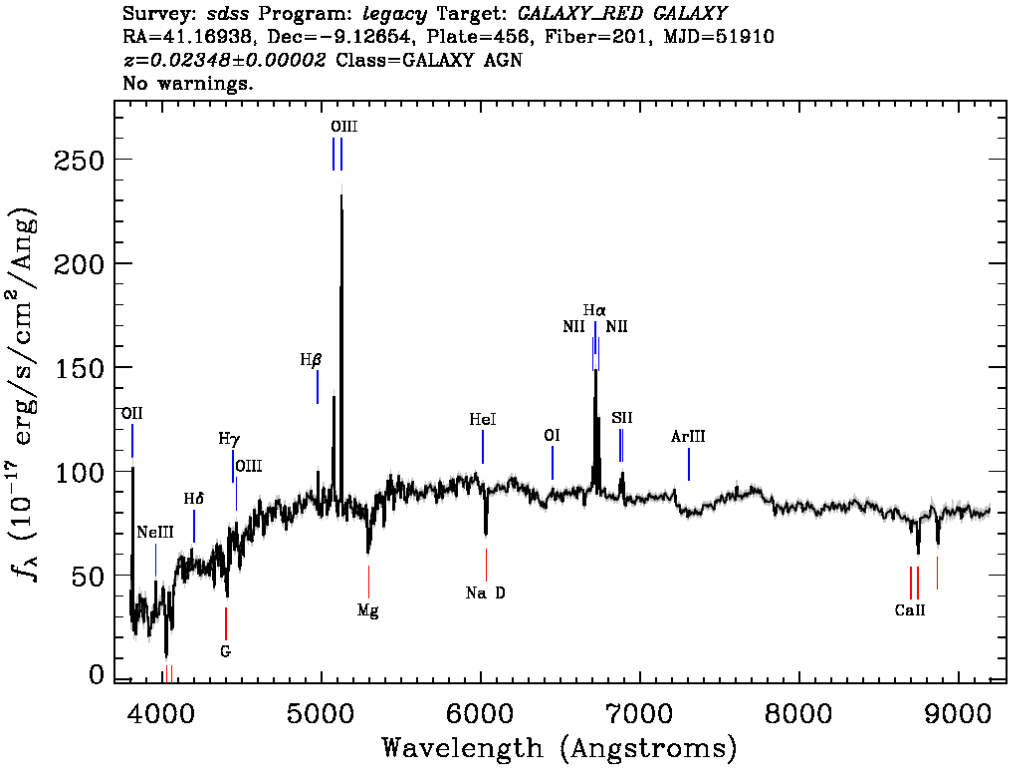




Galaxy sample

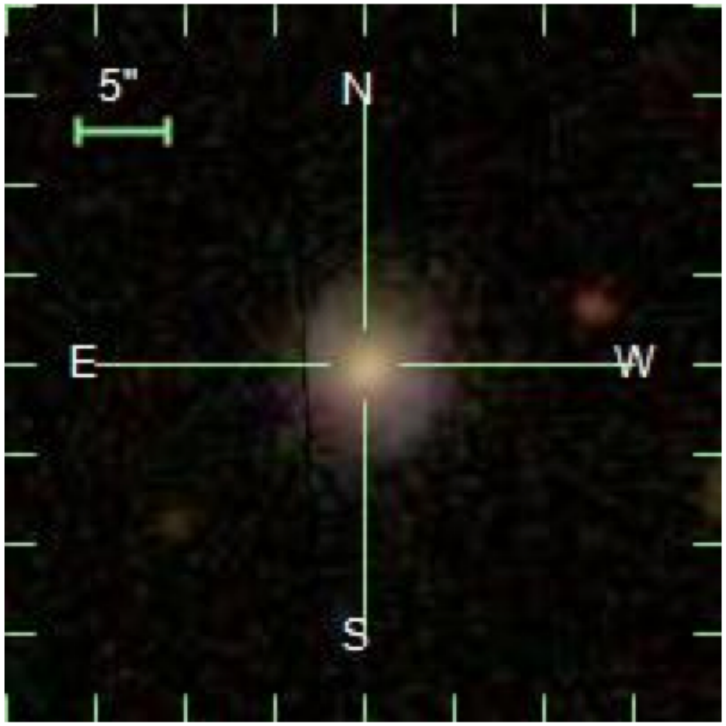
Galaxy 3

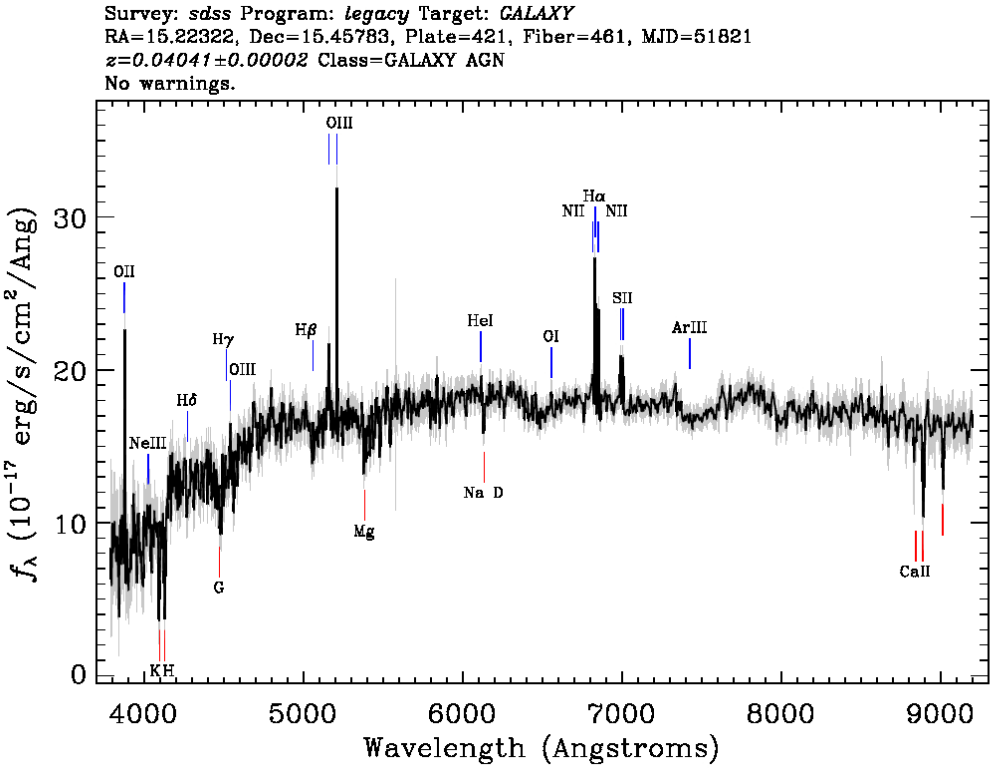




Galaxy sample

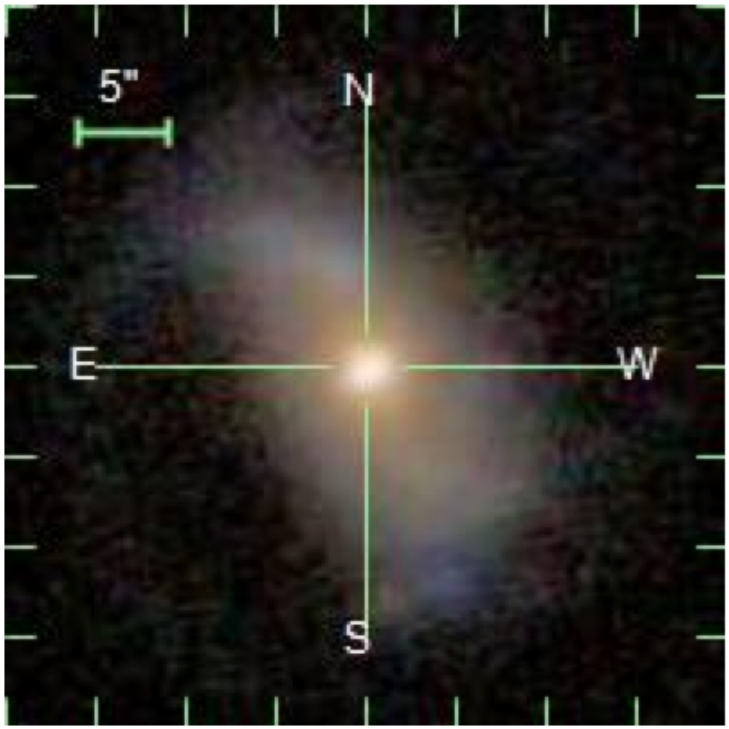
Galaxy 4

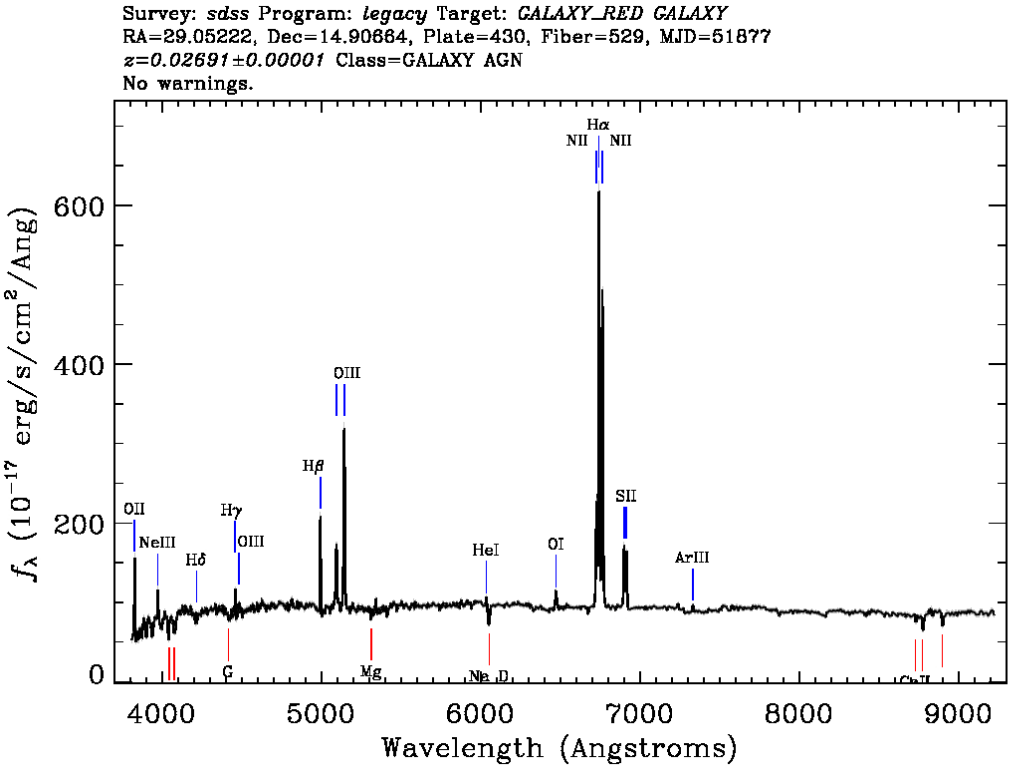




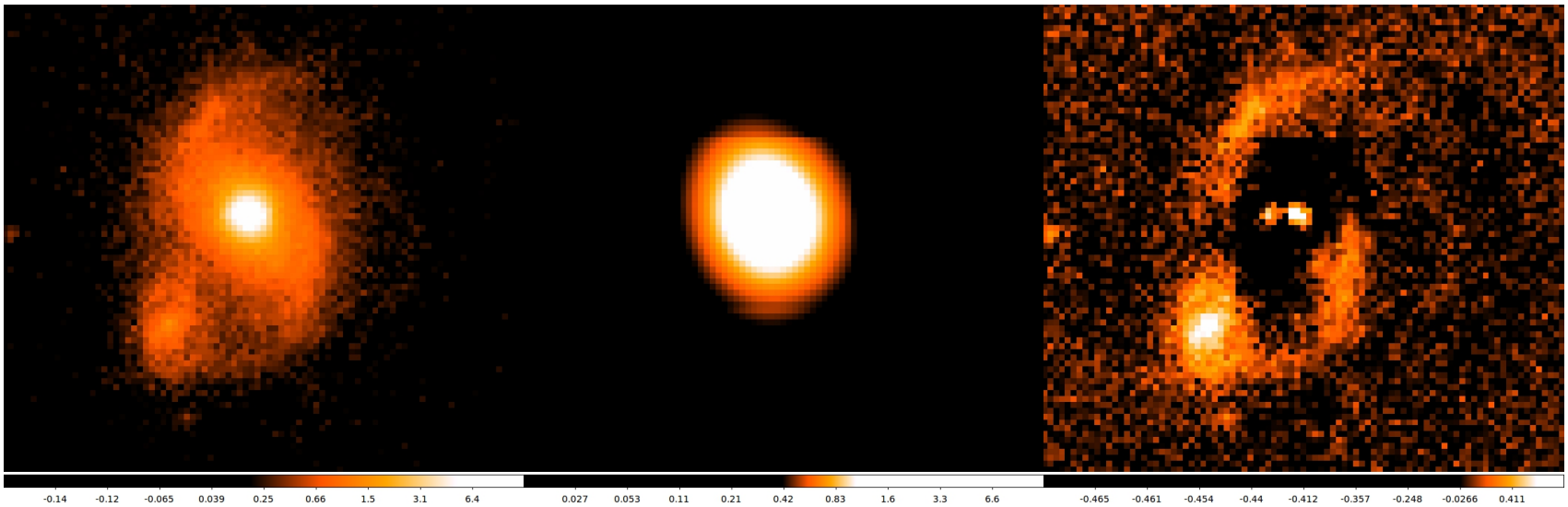
Galaxy sample

Galaxy 5

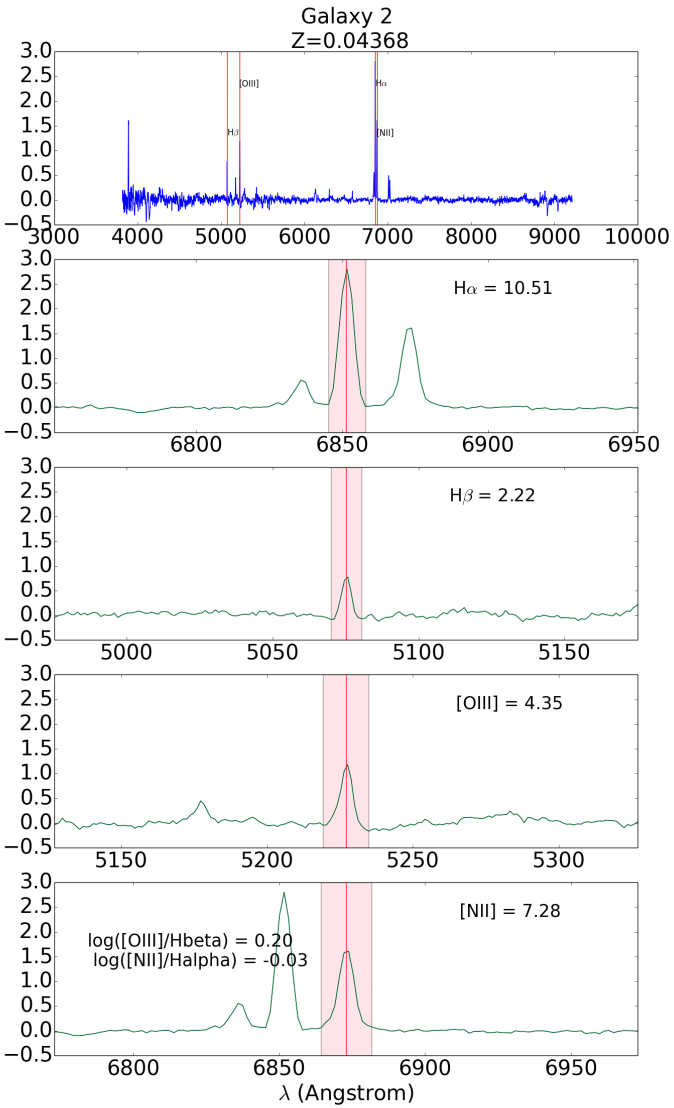


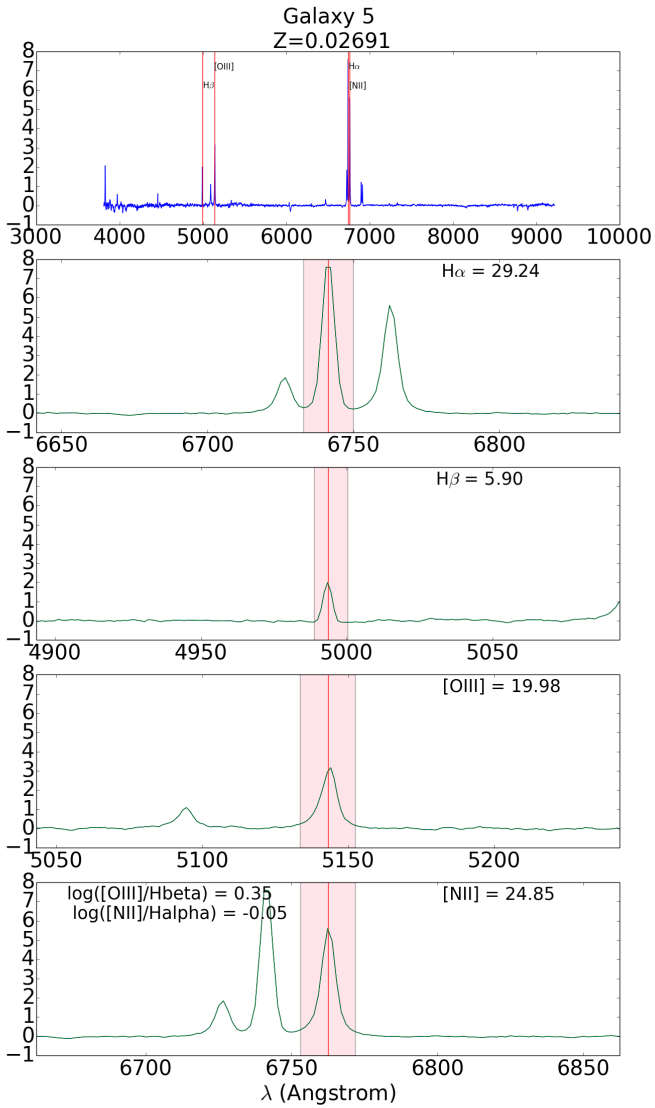


2-D fitting with GALFIT

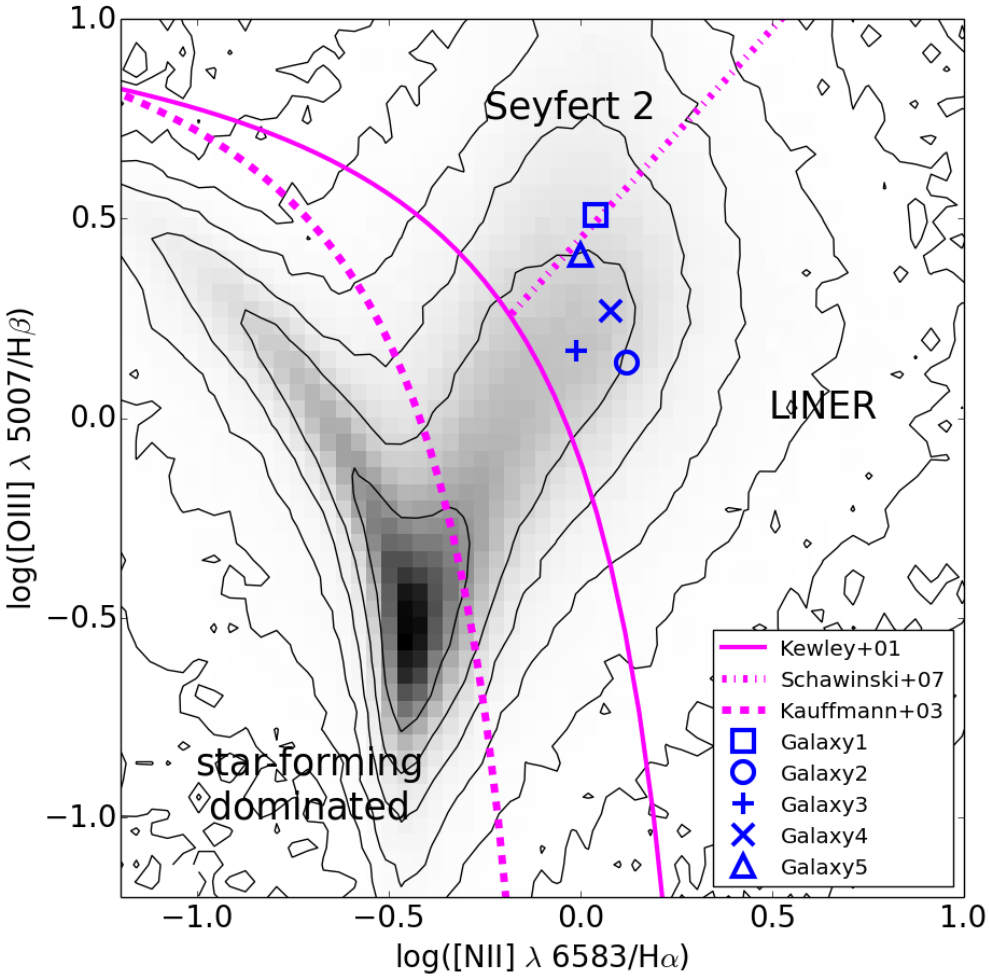


Line identification & line ratio measurements





Results


Seyfert 2
LINER
star-forming
dominated
Kewley+01
Schawinski+07
Kauffmann+03
Galaxy1
Galaxy2
Galaxy3
Galaxy4
Galaxy5
log([OIII] λ 5007/Hβ)
log([NII] λ 6583/Hα)
1.0
0.5
0.0
−0.5
−1.0
−1.0
−0.5
0.0
0.5
1.0

Summary

- Imaging not sufficient to classify galaxies - spectra essential
- BPT diagram - efficient tool to classify emission line galaxies
- Classified 5 galaxies in our sample as AGN-dominated (Seyfert/LINER) using BPT - consistent with literature

THANKS