

OUTLIERS OF THE ASK CLASSIFICATION AS TARGETS FOR GTC SERENDIPITY

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We classified the $\sim 10^6$ galaxy spectra in SDSS/DR7 (Abazajian et al. 2009) into only 17 major classes (ASK classification; Sánchez Almeida et al. 2010). The algorithm provides the goodness of the classification for each individual spectrum and, therefore, a straightforward way to identify those targets which do not fit in the ASK classes. A significant part of these outliers turn out to be failures of the automatic reduction pipelines. However, a fraction of them represents genuine unusual objects which deserve detailed follow up work to assess their nature. These targets provide a unique opportunity for GTC to carry out serendipitous discoveries. This contribution summarizes the main properties of the outliers.

The *quality* assigned to the classification of each galaxy (Sánchez Almeida et al. 2010, equation 4) gives the probability that the assignation is correct. Therefore, one can easily identify *outliers* of the ASK classification as those galaxies whose quality is low enough, a threshold that we (rather arbitrarily) set in this analysis at $quality \leq 0.01$. The criterion renders 4292 galaxies, or 0.5% of the SDSS/DR7 spectroscopic sample with redshift ≤ 0.25 . Each one of these spectra was visually inspected. Most of them turned out to be fake outliers: very noisy spectra, or spectra where the automated SDSS reduction pipelines seem to have failed (e.g., bad skylines removal or insufficient flat-fielding). However, 326 (0.04% of the original sample) do show spectra with no obvious flaws. They can be separated as:

- 20 red galaxies with abnormal lines (maybe, leftovers of bad sky-line subtraction; see the red solid line in Figure 1).
- 23 red galaxies with abnormal continuum.
- 11 galaxies with red continuum and emission lines (e.g., the black dotted line in Figure 1).
- 1 wrong redshift.
- 28 active galactic nuclei (AGNs), as judged from the large width of $H\alpha$. 12 of them present a rather

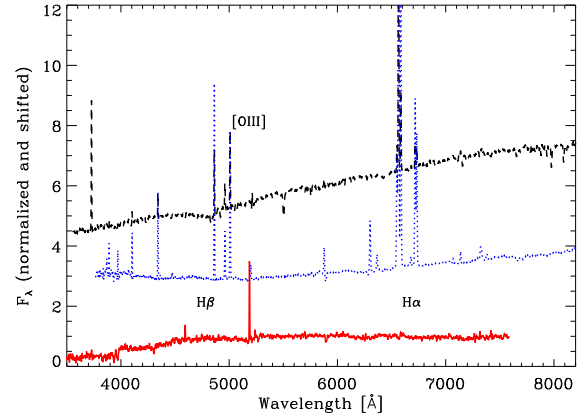


Fig. 1. Spectra of several outliers. Bottom (red solid line): red galaxy with abnormal emission line. Middle (blue dotted line): emission line galaxy with a continuum that upturns both in the blue and in the red. Top (black dashed line): extremely red object with emission lines.

flat continuum, 15 a blue-growing continuum, and 1 with a red-growing continuum.

- In addition to the AGNs in the previous item, 19 outliers are QSOs, as classified in NED. Nine show $H\alpha$ with a double peak (as, e.g., Tang & Grindlay 2009).
- 7 blue galaxies with emission lines not following the standard pattern of nebular emission (miscorrected sky lines?).
- 76 unusual spectra are not galaxies but HII regions of large galaxies.
- Finally, a large fraction of outliers seems to belong to the family of the *green peas* (Cardamone et al. 2009; Amorín, Pérez-Montero, & Vílchez 2010), i.e., star-forming galaxies whose integrated colors are dominated by emission lines. They are green (19), pink (35), or blue (87), depending on the redshift of the source.

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