OUTLIERS OF THE ASK CLASSIFICATION AS TARGETS FOR GTC SERENDIPITY

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We classified the \(~10^6\) 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 assignment 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 \( \leq 0.25 \). 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 sky-line 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 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.

REFERENCES