



Contribution ID: 155

Type: Poster

Type 1 and Type 2 AGN Catalogue from 6dFGS in the Southern Sky

Monday 7 July 2025 12:07 (1 minute)

An Active Galactic Nucleus (AGN) is the compact central region of a galaxy hosting a supermassive black hole that accretes gas and dust from its surroundings, often producing powerful outflows. Studying AGN provides critical insights into galaxy evolution and AGN-host interactions. Unlike the Northern Hemisphere, the Southern Sky remains underexplored in terms of AGN catalogues.

We present two comprehensive catalogues of Type 1 (Hon et al. 2025) and Type 2 AGN (Suresh et al., submitted) identified in the Six-degree Field Galaxy Survey (6dFGS), a spectroscopic redshift survey of the Southern hemisphere completed in 2006. AGN are recognised by the presence of strong emission features—either broad or narrow—in their optical spectra. Narrow emission-line galaxies were selected using a Median Absolute Deviation cut on the continuum-subtracted spectra. Spectral fitting was performed using PyQSOFit, a Python-based tool that was optimised to fit 6dFGS data in the rest frame, yielding robust measurements of key emission-line parameters. Each spectrum was visually inspected to confirm the AGN classification and to eliminate contamination from fibre cross-talk.

Our Type 1 AGN catalogue comprises 2,515 sources, while our Type 2 catalogue includes 2,744 AGN and 2,327 composite galaxies. This combined catalogue approach provides a valuable resource for future studies of AGN demographics in the Southern Sky. In particular, we aim to use this combined dataset to identify Changing-Look AGN through photometric variability detected by the upcoming Legacy Survey of Space and Time (LSST), enabling targeted follow-up spectroscopy.

Keywords - catalogues –galaxies: active –galaxies: Seyfert –galaxies: emission lines –galaxies: nuclei –techniques: spectroscopic

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Session Classification: Poster