Preprint Series in Particles and Cosmos Physics
nº IPARCOS-UCM-26-028

Narrow-Line Seyfert 1 Galaxies in the Dark Energy Spectroscopic Instrument Data Release 1

by V. S. Paliya, et al.(including A. Dominguez)

June 2026

Plaza de las Ciencias, 1 28040 Madrid, Spain
www.ucm.es/iparcos/

IPARCOS
INSTITUTO DE FÍSICA
DE PARTÍCULAS Y DEL COSMOS

UNIVERSIDAD COMPLUTENSE MADRID

INSTITUTO DE FÍSICA
DE PARTÍCULAS Y DEL COSMOS

IPARCOS

Abstract

Narrow-line Seyfert 1 (NLSy1) galaxies are peculiar active galactic nuclei (AGN) known to exhibit a variety of intriguing observational features from low-frequency radio waves to high-energy gamma rays. As of now, NLSy1 catalogs are primarily based on optical spectroscopic observations from the Sloan Digital Sky Survey (SDSS). Here we report, for the first time, a new catalog of NLSy1 galaxies using the high-quality optical spectroscopic observations made public in the first data release of the Dark Energy Spectroscopic Instrument (DESI). We performed a detailed spectral decomposition of more than 71,000 optical spectra of AGN not included in the SDSS catalog and located at redshifts below 0.9. From this sample, we identify 18,749 objects as NLSy1 galaxies for the first time. We also supplement the NLSy1 catalog with a sample of broad-line Seyfert 1 galaxies. The NLSy1 galaxies identified in the DESI data tend to have slightly higher bolometric luminosities and lower black hole masses (though with large dispersions), leading to higher Eddington ratios than those of the SDSS-NLSy1 sample matched in redshift and absolute B-band magnitude. Moreover, the fraction of DESI-NLSy1 galaxies detected in radio, X-ray, and gamma-ray catalogs was found to be lower than that of SDSS-NLSy1 sources. We conclude that deeper multiwavelength investigations of these enigmatic AGN will help unravel the low-luminosity end of the NLSy1 population. The catalog has been made available at https://www.ucm.es/blazars/seyfert and on Zenodo at https://doi.org/10.5281/zenodo.20484681.

UNIVERSIDAD
COMPLUTENSE
MADRID