



Contribution ID : 60

Type : Poster

Neural Network Classification of BL Lacs and FSRQs among X-ray/Gamma-ray Blazars discovered in the Fermi 4FGL-DR4 Unassociated Catalog

Wednesday, 28 October 2026 14:19 (1)

Of the 2423 unassociated sources in the fourth data release of the fourth Fermi Large Area Telescope catalog (4FGL-DR4), 748 had also been observed by the Neil Gehrels Swift Observatory's X-ray telescope for > 4 -ks. Neumann et al. (2026) recently used a neural network classifier to identify new local pulsars and high-energy blazars from these unassociated sources, and they classified 173 likely blazars from γ -ray sources with singular X-ray counterparts. We adopt these new likely blazar singlets, along with the 4FGL-DR4 blazar candidates of uncertain types, to search for further classifications of 281 total sources into BL Lac (BLL) and flat spectrum radio quasar (FSRQ) categories. From those 281 sources, 218 of them had not been previously analyzed by an earlier attempt to classify blazars into these dominant sub-classifications (Kaur et al. 2023). Using infrared to γ -ray parameters, we identify 136 likely BL Lac objects (Probability of BLL, $P_{\text{bll}} > 0.99$) and 29 likely FSRQs (with $P_{\text{bll}} < 0.01$) using a multilayer perceptron neural network classifier, while the remaining 116 sources remain ambiguous. A majority of these new sources are observationally much fainter than existing sources, by one or two magnitudes, enabling a direct probe into the lower-flux region of the existing blazar population. We propose further investigation into the optical spectra of these new, faint FSRQs to obtain spectroscopic confirmation and redshift estimates. Confirming these new sources will test how far into the observationally faint-source region the FSRQ population extends, and when coupled with redshifts, have the potential to extend the low-luminosity end of the blazar sequence.

Did you give a contributed talk at CASCA 2026?

No

If you are selected for a poster, would you be interested in giving a short flash talk on your work?

Yes

What is your career level?

MSc

Which keyword describes the area of focus of this talk?

Black holes

Primary author(s) : DEPPE, Sierra (McGill University, Penn State University)

Co-author(s) : NEUMANN, Kyle (Penn State University); Dr FALCONE, Abe (Penn State University)

Presenter(s) : DEPPE, Sierra (McGill University, Penn State University)

Session Classification : Black holes & Instrumentation