

Abstract

Thanks to the gamma-ray space observatories (in particular AGILE and Fermi satellites) thousands of sources were discovered emitting from 100 MeV to 100 GeV. The majority of the extragalactic ones belong to the class of jetted AGNs (blazars) and about half of them are classified as BL Lac objects, characterised by a (quasi)-featureless optical spectrum, which makes the determination of their redshift extremely difficult.

At the present time about one third of the detected gamma-ray sources are still not associated to optical objects and their nature is unknown.

Although most of these unassociated sources are expected to be blazars, one cannot exclude that some of them hide new classes of objects.

To investigate the nature of these gamma-ray sources, we are carrying out an extensive optical spectroscopical campaign, at the 10m Gran Telescopio Canarias (La Palma), to secure high S/N spectra of their optical counterparts.

These observations allow us to assess the classification of the targets, to recognise new blazars and to measure their redshift.

We present the results of this on-going campaign covering about 150 targets, including TeV and neutrino candidates and high redshift BL Lacs.

For ~ 40 objects new redshift have been determined and for the others robust lower limits to z are proposed on the basis of non detection of the spectral absorption features of the host galaxies. These results are of importance in the context of emission models of the sources, the cosmic evolution of the blazar population and for the characterization of the EBL from their GeV-TeV spectrum.