

Radio and GeV-TeV gamma-ray emission connection in the different blazar sub-classes

Tuesday, 9 October 2018 15:30 (15 minutes)

The Fermi-LAT revealed that blazars dominate the census of the gamma-ray sky, and a significant correlation was found between radio and gamma-ray emission in the 0.1-100 GeV energy range. However, the possible connection between radio and very high energy (VHE, $E > 0.1$ TeV) emission still remains elusive, owing to the lack of a homogeneous VHE sky coverage.

With this work we aim to quantify and assess the significance of a possible connection between the radio emission on parsec scale measured by the very long baseline interferometry and GeV-TeV gamma-ray emission in blazars, which is a central issue for understanding the blazar physics. We use two large and unbiased AGN samples extracted from the 1FHL and 2FHL catalogs, and for comparison, we perform the same analysis by using the 3FGL 0.1-300 GeV gamma-ray energy flux.

Overall, the radio and gamma-ray emission above 10 GeV turns out to be uncorrelated for all the blazar sub-classes with the exception of high synchrotron peaked objects. Conversely, when 0.1-300 GeV gamma-ray energies are considered, a strong and significant correlation is found for all of the blazar sub-classes. We interpret these results within the context of the blazar spectral energy distribution properties.

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Session Classification: The non thermal world: multi-messenger and jets