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The gamma-ray emission of young radio galaxies and quasars

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According to radiative models, radio galaxies are predicted to produce gamma rays since the first stages of their evolution. The study of the high-energy emission from young radio sources is crucial for providing information on the most energetic processes associated with these sources, the actual region responsible for this emission, as well as the structure of the newly born radio jets.

Despite systematic searches for young radio sources at gamma-ray energies, only a handful of detections have been reported so far. Taking advantage of more than 11 years of Fermi-LAT data, we investigate the gamma-ray emission of 162 young radio sources (103 galaxies and 59 quasars), the largest sample of young radio sources used so far for a gamma-ray study. We analyse the Fermi-LAT data of each individual source separately to search for a significant detection. In addition, we perform the first stacking analysis of this class of sources in order to investigate the gamma-ray emission of the young radio sources that are undetected at high energies.

We report the detection of significant gamma-ray emission from 11 young radio sources, including the discovery of significant gamma-ray emission by the compact radio galaxy PKS 1007+142.

Although, the stacking analysis of below-threshold young radio sources does not result in a significant detection, it provides stringent upper limits to constrain the gamma-ray emission from these objects.

In this talk we present the results of our study and we discuss their implications for the predictions of gamma-ray emission from this class of sources.

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