



PhD Summer School on Neutrinos
Here, There & Everywhere

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Constraining very high energy diffuse gamma (and neutrino) emission with Tibet AS γ data.

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The Tibet AS γ experiment provided the first measurement of the total diffuse gamma-ray emission from the Galactic disk in the sub-PeV energy range.

This measurement can be used to constrain the cosmic-rays (CRs) space and energy distribution and consequently the gamma-neutrino Galactic diffuse emission, produced by the interaction of CRs with the interstellar medium.

The interpretation of Tibet AS γ observational data might be not straightforward because of the presence of a non-negligible contribution from faint unresolved sources that adds up to the truly diffuse emission produced by CRs, shaping the energy and space dependence of the total (i.e. truly diffuse + unresolved) observed gamma-ray flux.

Based on analysis of the TeV sources included in the HGPS catalog, we predict the expected contribution of unresolved pulsar-powered sources in the two angular windows of the Galactic plane observed by Tibet AS γ . We show that, with the inclusion of this additional diffuse component due to unresolved sources, the Galactic diffuse emission well saturates the Tibet data, without the need to introduce a progressive hardening of the CR spectrum toward the Galactic center. Under this condition, one obtains a prediction of the Galactic neutrino diffuse emission above 100 TeV showing that they can contribute at most to 5% of the total neutrino flux observed by IceCube.

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