

# A multi-messenger study of the total galactic high-energy neutrino emission

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A detailed multi-messenger study of the high-energy emission from the Galactic plane is possible nowadays thanks to the observations provided by gamma and neutrino telescopes. We show the potential of this approach by using the total gamma flux from the galactic plane measured by HESS at 1TeV and in the longitude range  $-75^\circ < l < 60^\circ$ . We compare the HESS observational data with expectations for diffuse gamma emission, calculated by using different assumptions for the CR distribution in the Galaxy. We highlight the existence of an extended region of the galactic plane where the observed flux is substantially larger than the diffuse emission, thus calling for an additional contribution of comparable or larger intensity, possibly due to cumulative emission of resolved and unresolved gamma-ray sources. If this additional contribution is due to hadronic interactions, the considered region also produces a large neutrino flux and should be considered as a preferential target for the search of a galactic component in neutrino telescopes. We estimate the total contribution (i.e. including both diffuse and the source components) of this region to the IceCube HESE neutrino dataset as a function of the spectral index and energy cutoff of the sources, taking also into account the upper limit on galactic neutrino emission provided by Antares.

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