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A neutrino emission model to calculate neutrino fluxes from pp and pγ interactions for different Gamma Ray Bursts populations

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Neutrino emission can be expected from Gamma Ray Bursts (GRBs) through hadronic interactions, though the exact neutrino flux may vary depending on the GRB environment. To test the neutrino emission at different energies in different environments and improve the description of low-energy or thermal contributions, we created a model calculating the neutrino yield from GRB internal energy dissipations. We assume a proton spectrum consisting of a thermal distribution combined with a non-thermal power law proton distribution. These protons interact between themselves as well as with photon spectrum, modelled as a Band function, to create pions. The pion and muon decays as well as the photon-proton interactions have been simulated using the newly released AM3 software to calculate the expected neutrino flux. The obtained result includes sub-TeV neutrinos from the thermal proton population. The flux at Earth is obtained for different parameters to demonstrate the possibilities of probing various GRB populations with the current and next generation of neutrino telescopes.

Poster prize

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